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ABSTRACT

This book presents New York State planning standards for school buildings. The standards offer advice and counsel to school districts, architects, and engineers to help them resolve their school building problems while considering educational and planning efficiency, conservation of natural resources, and initial and long-range economy within the context of the most recent state and federal laws. It includes the minimum requirements that must be followed as well as optional recommendations. Listed are requirements that are currently in effect. The specific areas addressed in the standards include: structural and safety planning; materials; environmental considerations; site conditions and utilities; mechanical and electrical planning; heating, ventilating, and air conditioning; plumbing and gas facilities; electrical work; existing buildings; procedures for design and construction; and operations and maintenance considerations. Eleven appendixes feature a glossary, reference standards, laws relating to school building projects, regents rules, temporary quarters, health and safety during construction, administration buildings, maintenance and storage facilities, and accessibility. (RJM)

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Manual of Planning Standards

ED 419 369

educational facilities

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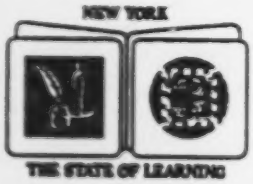

The University of the State of New York
The State Education Department

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MANUAL

OF

PLANNING STANDARDS

FOR

SCHOOL BUILDINGS

September 1996

originally published
1965

The University of the State of New York
The State Education Department
Office of Facilities Planning and Management Services
Albany, New York 12234

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PREFACE

Although focused on teaching and learning, education must also address the need to maintain a safe, secure, and healthy school environment. The capacity of children to learn is impeded if their school environment contains elements which are hazardous to their health. The State Education Department and educators throughout the State of New York have a responsibility to assure the school community and the public that, based on the best available knowledge, school buildings are safe, healthy, clean and in good repair.

In December 1994, the New York State Board of Regents adopted the following guiding principles developed by the Regents Advisory Committee on Environmental Quality in Schools:

- Every child has a right to an environmentally safe and healthy learning environment which is clean and in good repair.
- Every child, parent, and school employee has a "right to know" about environmental health issues and hazards in their school environment.
- School officials and appropriate public agencies should be held accountable for environmental safe and healthy school facilities.
- Schools should serve as role models for environmentally responsible behavior.
- Federal, State, local, and private sector entities should work together to ensure that resources are used effectively and efficiently to address environmental health and safety concerns.

Among the many responsibilities of the Commissioner of Education is that of establishing and enforcing school building construction standards for the health, comfort and safety of pupils attending the public schools. Accordingly, a procedure has been established whereby all plans and specifications for the erection, repair, enlargement or remodeling of school buildings in any public school district in the State must be reviewed and approved by the Commissioner. The Office of Facilities Planning and Management Services performs this function. However, we strive to extend its service far beyond the function of regulations. We strive to offer advice and counsel to school districts, architects and engineers to help them resolve their school building problems with consideration of educational and planning efficiency, conservation of natural resources, initial and long-range economy and within the context of the most recent State and Federal laws.

The 1996 edition of the Manual of Planning Standards includes all amendments and revisions to the 1977 manual and the original manual issued in 1965. Those manuals, plus updating revisions, proved invaluable to school district architects and engineers and simplified and expedited review and approval of plans and specifications by the Office of Facilities Planning and Management Services. We would like to emphasize several things about this publication.

1. Included herein are both minimum requirements which must be followed and recommendations which are optional. The distinction is indicated by the language used (e.g., such words as "shall" and "must" indicate requirements; "should" and "may" indicate recommendations).

2. The requirements stated herein are those which are currently in effect. Revisions will be made from time to time because of changes in fire safety regulations, construction techniques, technological developments and changes in materials, as well as by progress in education which has implications, as for space requirements and types of facilities. As revisions are made they will be published in the School Executive's Bulletin which can be ordered by contacting Facilities

Planning. Relevant information is available on the Office of Elementary, Middle, Secondary and Continuing Education's (EMSC) Gopher at UNIX10.NYSED.GOV. This Manual and other useful planning information is available via the World Wide Web at http://www.nysed.gov/fmis/facplan/.

3. For help, technical assistance or current information relating to the layout of spaces and recommended equipment for the various curriculums, contact the Education Department's Office of Facilities Planning at (518) 474-3906 or by fax at (518) 486-5918.

We actively seek competent advice and welcome suggestions as to how our requirements might be improved to keep pace with educational and technical developments. Also, we will be glad to consider applications for approval of experimental projects which deviate from established standards if it seems reasonable to expect that important findings may result therefrom.

We urge that all school officials confronted with building needs contact the Office of Facilities Planning for consultation before detailed planning is undertaken. In this way costly mistakes and delays may be avoided. Even more important, early consultation will give us the opportunity to help districts secure the buildings best suited to their educational needs within the resources available.

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Finally, we wish to remember Stan Baltzel, former Bureau Chief of Facilities Planning, whose thoughtful comments and ideas are reflected on the pages of this manual.

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S1 GENERAL

a. Any school district which proposes to erect, repair, enlarge, or remodel a school building must investigate the necessity of submitting plans to the Office of Facilities Planning in accordance with current administrative procedures. The extent and scope of the submission is dependent on size of project and type of school district. See Appendix E.

b. School Boards, School Administrators, Architects and Engineers should thoroughly understand current requirements in respect to submission, review, and approval of plans and specifications and compliance with mandatory health, comfort, and safety regulations. See Appendix E.

c. Schools shall conduct environmental site audits for new building construction, including adjacent land, to identify potential environmental health hazards.

d. Schools shall use construction materials and school supplies which are less toxic and less hazardous to building occupants.

e. School buildings, when designed or renovated, shall use design principles and construction materials which further the goals of conserving energy, ensuring good indoor air quality, pest-proofing, radon-proofing, and easing maintenance, and include other factors contributing to positive learning environments.

S2 AUTHORITY

S2-1 Appraising and Approving School Building Plans

a. The authority of the Commissioner of Education for appraising and approving plans will be found in paragraphs 1, 2 and 3, Section 408 and Section 409 of the Education Law (Appendix C).

S2-2 Planning Standards

a. The authority for the standards set forth in this Manual is derived from:

1. Regents Rules, Section 14.1 See Appendix D.

2. Commissioner's Regulations, Title 8, NYCRR, Part 155. See Appendix D.

S3 SCOPE

a. This Manual of Planning Standards pertains to all public school buildings, with the exception of those schools in New York City.

b. The Manual covers the construction of new buildings, additions and alterations as described in the Local Finance Law, and as further described in the Regulations of the Commissioner of Education, Part 155. See Appendices C and D.

S4 NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE

a. Specific requirements which are not defined in this Manual shall be in compliance with the provisions of Title 9, Subtitle S, Chapter I, Volume 9 Executive (B) [the New York State Uniform Fire Prevention and Building Code (the Code)].

S5 REFERENCE STANDARDS

a. All construction, including structural, mechanical and electrical shall conform to the Code, commonly accepted good practice and to the generally accepted "Reference Standards" listed in the Code.

S6 FINAL AUTHORITY

a. Decisions concerning requirements shall be determined by the Commissioner. In any conflict between the Code, the "Reference Standards", and this Manual, the stricter requirements shall govern.
   1. Variances from the requirements of this Manual may be considered by the Office of Facilities Planning upon evaluation of written requirements established by the Commissioner for the specific project.
   2. Variances from the Code may be pursued by application to the Board of Review procedure with the New York Department of State; telephone number (518) 474-4073, Codes Division.

S7 RESPONSIBILITY

S7-1 Architects and Engineers

a. All design for new school construction, additions, and alterations and compliance of plans and specifications with the requirements of this Manual are the direct responsibility of the architect and engineers retained by the Owner (Board of Education).

S7-2 School Boards and School Administrator's

a. In addition to the School Board's and School Administrator's responsibility for both immediate and long range planning, it is also their responsibility to provide architectural and engineering services and adequate supervision or periodic inspection through the architect or engineer for all new construction and for all additions, alterations, and renovations.

S8 REQUIREMENTS MINIMUM

a. Requirements set forth herein are minimum unless otherwise specifically approved by the Commissioner due to unusual conditions.

b. Requirements exceeding those of this Manual may be deemed necessary by the Commissioner to insure health and safety. Such a building will be reviewed as to its individual characteristics.

S9 COMPETITIVE BIDDING AND AWARDS

See Appendix C.

S10 GLOSSARY AND DEFINITIONS

a. Definition of words, terms, and phrases are listed in the appendix. See Appendix A.

S11 SUPPLEMENTARY PAMPHLETS AND BROCHURES

a. The Office of Facilities Planning has published a series of articles in the School Executive's Bulletin concerning special areas of concern and education spaces. School planners should refer to these in conjunction with the requirements and recommendations set forth in this Manual. See above. These articles are available at our world wide web site.

S12 DESIGNATION OF SPACES

a. Spaces are approved for pupil occupancy as designated on approved plans. Change of use which might affect the health, comfort, and safety of the pupils shall not be made without the approval of the Commissioner.

S13 ADMINISTRATIVE PROCEDURES

a. See Part X.

PART I

STRUCTURE AND BUILDING SAFETY

S101 GENERAL

a. No construction materials shall be used and no type of construction shall be permitted which would endanger the health, safety, or comfort of occupants of the facility.

S102 GENERAL REQUIREMENTS FOR CONSTRUCTION

a. Construction shall be Class "A," "B," or "C" as defined by the Local Finance Law, (Appendix C) with fire resistance of structural elements as required herein.

1. Fire resistance ratings shall be as contained in Minimum Fire Resistance Tables 704 of the Code except as modified by S102b and c.

2. The Glossary, (Appendix A) relates Class A, B, and C construction to Type 1, 2, 3, 4, and 5 construction classification set forth in Part 704 of the Code.

b. One Story Buildings: may be Class A, B, or C (Code type 1, 2, 3, 4, or 5) construction, except that all places of assembly, excluding gymnasiums, having an area over 4000 square feet (not including stages) shall be Class A (Code type la, lb, 2a, or 2b). Fire areas of such buildings shall conform to limits set forth in Table 705 and section 705 of the Code.

c. Two and Three Story Buildings: shall be Class A (Code type la, lb, 2a,or 2b) construction. Fire areas of such buildings shall conform to limits set forth in Table 705 and section 705 of the Code.

d. Over Three Story Buildings: shall be Class A (Code type la, lb, or 2a) construction as determined by fire areas listed in Tables 705 and section 705 of the Code; and shall be in conformance with applicable provisions of the Code as determined by the Commissioner.

S102-1 ELEVATOR

a. An elevator for service use as well as suitable for passenger use shall be provided between all levels of multistoried facilities, unless such levels are interconnected by ramps.

S103 CORRIDORS

S103-1 General

a. The designated widths of all corridors shall be the clear width, free of all fixed and movable obstructions except as noted here:

1. Drinking fountains may project 4 inches.
2. Non-recessed radiators adjacent to exits may be used where exit doors are narrower than the corridors, but shall not project beyond exit door frames.
3. Doors serving spaces used strictly for custodial storage and similar use may swing into a corridor.
4. For Places of Assembly see S104-2.
5. All other equipment such as fire extinguishers, gates, rolling grilles, and radiators (except

as noted in #2 above) shall be fully recessed.

b. In case lobbies or corridors are used for purposes other than circulation, they shall be planned with full uninterrupted aisles equivalent to required corridor widths and separated by a fixed rail or other type of approved permanent divider.

c. Any point in any ground floor corridor must be within 150 feet along the line of travel to an exterior doorway. Any point in a corridor other than a ground floor corridor shall not exceed 120 feet along the line of travel to the stair enclosure of an exit stairway.

d. Corridor pockets and dead end corridors shall be restricted to a depth of 1 and 1/2 times the width of the pocket, or to 1 and 1/2 times the width of the corridor, whichever is less.

e. In "OPEN PLAN" buildings or portions of buildings so planned which do not have corridors in the traditional sense, no point in the open-planned area shall be more than a 75 foot straight line distance to an exit into a separate smoke zone. Each open-planned area must have exits into separate smoke zones at remote locations. Such exits may be exterior doors, enclosed stairs, smoke barriers and/or approved exit passage-ways. See also S104-6 Spaces of Pupil Occupancy Without Corridor Concept; S109, Smoke Control.

S103-2 Main Corridors

a. A main corridor is one which serves more than four standard classrooms, or more than 150 pupils.

b. Minimum clear width without lockers or wardrobes, 8'-0" wide wall to wall.

c. Corridor widths for large schools, particularly high schools, should be as wide as necessary for satisfactory circulation.

S103-3 Secondary Corridors

a. A secondary corridor is one which serves four or less classrooms, or not more than 150 pupils, exclusive of service areas. Consideration should be given to making these secondary corridors equal to the width of the main corridors for the addition of future classrooms.

b. Minimum clear width shall be 6'-0".

c. Secondary corridors are limited to 100'-0" and must terminate in an exit.

S103-4 Passageways

a. A passageway provides access to rooms or areas not in the line of travel to main exits, such as passageways serving offices, locker rooms, or kitchen areas. These passageways vary in width according to the number of occupants involved but shall have a minimum width of 44 inches.

S103-5 Corridors with Lockers

a. Corridor lockers must be permanently attached and must provide for ease of maintenance and cleaning. Corridor locker doors may not project into the required corridor width.

1. Main Corridors

a. With lockers on one side, 9'-0" wide face of locker to face of opposite wall (Assuming 12" lockers)

b. With lockers on two sides, 10'-0" wide face to face of lockers (Assuming 12" lockers)

2. Secondary Corridors

a. With lockers on one side, 7'-0" wide face of locker to face of opposite wall (Assuming 12" lockers)

b. With lockers on two sides, 8'-0" wide face to face of lockers (Assuming 12" lockers)

S104 EXITS

S104-1 General

a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy for all school buildings so that, when a pupil enters into a corridor from a room of pupil occupancy, he shall have a choice of two unobstructed means of egress in different directions.
See Exit, Appendix A.

b. Receiving areas cannot be used for exiting purposes.

c. During construction of building additions (and alterations), the required exits in the existing building must be kept clear and maintained with Code required fire rated enclosures.

d. Fixed and movable gates shall not be located so that they create dead end conditions for occupied spaces when the gates are in use. (Smoke-stop doors with panic hardware can generally be installed in lieu of gates to provide desired lockable administrative control, yet avoid dead end conditions beyond the doors.)

e. Building exits cannot discharge into completely enclosed courts. See courts.

f. Exiting through adjacent spaces other than corridors will not be allowed, unless specifically authorized.

g. Folding or rolling partitions and sliding or overhead doors are not to be considered as exits.

h. Required exits shall always be located remote from each other within a room or enclosed area. Exits shall be distributed as uniformly as possible along the perimeter of the room; as at diagonally opposite room corners.

i. See section 105, Door Hardware; 106, Doors.

j. Remote exiting into separate smoke zones is required for projection booths of 500 square feet or more in area. Handicapped access is required in new construction. See Appendix J.

S104-2 Areas of Public Assembly Exits

a. An Area of Assembly is defined as any area for the assembly of more than 50 persons, and spaces over 1,000 square feet which are used for assembly occupancy of pupils; such as:

1. Auditoriums and Little Theaters (not including the front platform or stage)
2. Cafeterias
3. Courts - where so designed
4. Gymnasiums
5. Group Instruction Rooms
6. Music Rooms
7. Natatoriums having spectator space
8. School libraries will not be considered an area of public assembly except where size and layout indicate otherwise.

S104-2 b. Requirements for exit widths shall be in accord with the Code. Generally, it is not necessary to assume areas of assembly and other instructional areas as being occupied simultaneously. The number of exit units required shall be determined in the following manner:

(1) Auditorium:

$$\frac{\text{floor area}^*}{600} = \text{R.E.U.}^{**}$$

(2) Stage (including wings):

$$\frac{\text{floor area}^*}{1200} = \text{R.E.U.}^{**}$$

(3) Cafeteria:

$$\frac{\text{floor area}^*}{600} = \text{R.E.U.}^{**}$$

(4) Gymnasium:***

$$\frac{\text{bleacher area}^*}{250} \text{ plus } \frac{\text{remaining floor area}^*}{600} = \text{R.E.U.}^{**}$$

(5) Natatorium:

$$\frac{\text{bleacher area}^*}{250} \text{ plus } \frac{\text{remaining floor area}^*}{1500} = \text{R.E.U.}^{**}$$

* net floor area in square feet

** R.E.U. - required Door Exit Units see exit widths in the Code.

*** where larger than normal size of facility results in substantial numbers of R.E.U., a reduction may be considered by the Office of Facilities Planning.

c. No single exit doorway from places of assembly shall be less than 36 inches wide and whenever possible shall be a direct exit through an exterior wall. See S104-l.h.

d. Spaces involving music performance, rehearsal and instruction shall have doors sized to provide sufficient clearance for the passage of pianos and other instruments or equipment.

e. Exit doors for places of assembly, which open into a corridor, shall open outward in direction of travel, shall be fully recessed in new construction to leave a minimum clear corridor width as required in S103-2b, or in reconstruction shall swing through 180° and leave a clear corridor width of 5'-0" while in their greatest projecting position.

f. When folding partitions are used to separate floor areas in any gymnasium, a pass door may be acceptable as one of the required exits and must swing in the direction of exit travel.

g. Stages and Platforms over 500 square feet shall have remote exits. Interior doors from stages of 1,000 square feet or more, and doors from work rooms and storage rooms which open on such stages shall be "B" label, self-closing fire doors. Acoustical isolation performance of doors between stages or auditoriums and adjacent spaces must be considered, see Part III. Stages which do not meet the requirements of S104-2h shall be designed as part of the assembly space.

h. Stages 24' deep, 24' clear height and/or having fly scenery equipment shall meet the requirements of the Code for stages.

i. Projection booths and rewinding rooms shall have a door at least 32" wide. The door shall be self-closing, "C" labeled, and opening outward in direction of travel. Remote exiting into separate smoke zones is required for projection booths of 500 square feet or more in area.

S104-3 Auditorium Type Seating

a. Typical Seating

1. There shall be no more than 7 seats between any seat and a longitudinal aisle. (This is interpreted to allow a maximum of 15 seats between aisles.)

2. Minimum width of longitudinal aisles shall be at least the average required width throughout, based on a minimum aisle width at the front of the area of 36 inches with seats on both sides of the aisle, 30 inches with seats on only one side, with the aisle width increased at least 1/4 inch per foot of distance to the rear exits.

3. No more than 6 rows of seats may be served by a longitudinal aisle which is not relieved by an exit at each end. (i.e., a maximum 6 row deep dead end aisle is permissible.) Where a longitudinal aisle which is not relieved by an exit at each end serves 7 or more rows of seats, a cross aisle connecting to an exit must be provided at the unrelieved end of the longitudinal aisle.

4. Cross aisles shall be provided across the front of the first row of seats, and so that there are not more than 26 rows of seats between cross aisles. Cross aisles shall be of width at least equal to the widest aisle to which they connect or the width of the exit to which they connect.

b. Minimum Spacing:

1. Back to back spacing of seats shall not be less than 33 inches, and

2. Minimum clear distance between a seat in the up position, in the case of self-rising seats, or tablet arm in the down position, and the plumb line of the back of the seat in front shall be 12 inches, or 16 inches with "continental" seating, or

3. Minimum clear distance between a seat in the down position, or tablet arm in the used position, and the plumb line of the back of the seat in front shall be 5 1/2 inches, or 10 inches with "continental" seating.

c. "Continental" Seating:

1. The number of seats in a row is not limited where seats are the self-raising type and at least a 16 inch passage is provided between the seat in its lowered position and the horizontal projection to the seat in front.

2. Side aisles not less than 4'-0" width shall be provided, on which there are exit doors not more than 10'-0" apart. (For the purposes of this division, the 10'-0" shall be measured between adjacent jambs.)

S104-4 Courts

a. All courts which have their perimeters completely enclosed are considered to be potential areas of pupil occupancy and as such must have exiting into two separate smoke zones.

b. Courts of less than 6,000 square feet area shall have at least two exits, remote from each other, equipped with classroom function hardware operable from the court, with doors swinging in the direction of egress. Hardware from courts designed as a place of assembly shall be panic type operable from the court.

c. Courts of more than 6,000 square feet area shall be exited on the basis of one exit unit (R.E.U.) per 2,000 square feet with a usual maximum of six R.E.U. Exits shall be remote from each other and equipped with panic hardware operable from the court.

d. When security is a factor, an automatic alarm system can be installed.

e. Enclosed courts created by an addition which can not be designed to eliminate a required building or assembly area exit into the new court may be approved on an individual case basis providing an exit from the court through a two hour rated passage directly (line of sight) to the exterior of the building can be provided with proper hardware and lighted exit signs.

S104-5 Space of Pupil Occupancy - WITH Traditional Corridor Concept:

a. All doors to corridors from spaces of pupil occupancy shall swing into the room unless fully recessed. Doors from rooms of 1,000 square foot shall swing out.

b. Class "A" or Class "B" Heavy Timber Construction (see Appendix A) - every space in a building of pupil occupancy over 500 square feet in area, shall have two separate means of egress from the space, each into a separate smoke zone. The primary exit is commonly the opening to the corridor. The second exit may be a door opening into a separate smoke zone; or, a door directly to the exterior; or, a window of such size and design that will facilitate egress; or, a door providing egress through adjacent spaces where specifically approved.

c. Class "B" and Class "C" Construction - every space of pupil occupancy shall have an exit to the corridor and, in addition, a door directly to the exterior.

d. No point in a space of pupil occupancy of less than 1,500 square feet shall exceed a 50 foot straight line distance to the opening to the corridor. Any additional exit(s) necessary to satisfy the 50 foot requirement shall be remote and, unless an emergency window is provided, into separate smoke zones. See S109-3.b.3.

e. Spaces of pupil occupancy over 1,500 square feet area shall have remotely located room exits into separate smoke zones, except that such exits may be into the same smoke zone if no point in the space exceeds a 50 foot straight line distance to an exit and an emergency rescue window

is provided. (With appropriate hardware, a pass door in an overhead garage type door can be approved as the second exit.) See S109-3.b.3.

f. Divided spaces: In rooms planned for division into two, or more, separate areas by means of folding or movable type partitions, each divided area shall have its own exits and the combined space shall have proper remote exiting. Combined classrooms are not automatically areas of public assembly.

g. Self-contained rooms created by wardrobes, cabinetry, or other furniture which present obstructions to egress, rather than those created by traditional walls, partitions, and doors, must meet all the above criteria. Corridors must be provided, with applicable travel distances in corridors and rooms.

h. Rescue Windows: See Section 104-7.

i. Smoke Zones: See Section 109-3.

S104-6 Space of Pupil Occupancy WITHOUT Corridor Concept

a. When spaces of pupil occupancy are defined in an open area by wardrobes, cabinetry, and other furniture which DO NOT present obstructions to egress and allow students to circulate freely from one space to another, the total open space can be considered, for exiting purposes, as a single space.

b. Each open-planned area shall have exits into separate smoke zones at remote locations. No point in such an open-planned area shall be more than a 75 foot straight line distance to an exit into a separate smoke zone. Corridor exitways, in the usual sense, are not required within the open-planned area; however, space for circulation of students needs to be provided for successful daily use.

c. Furniture layouts of all open-planned areas indicating the concept of free circulation must be submitted for review prior to approval of preliminary plans and submitted again with materials for final approval. Future operation within the open space must maintain the free circulation and location of movable cabinetry and furniture which would present obstructions to egress and restrict exiting shall be avoided.

d. Smoke Zones: See Section 109-3.

e. When enclosed pupil occupied space(s) are required by function to be arranged so that the normal pupil access to the space is through an open-planned area, the enclosed spaces shall have one exit as required in S104-5 and emergency rescue windows so that fire exiting from this enclosed space does not go through the open planned area.

S104-7 Rescue Windows

a. Emergency rescue windows, as required in Section 104-5, shall be windows (and window hardware) of such size and design that will permit and facilitate emergency egress through them. It is recommended that all classroom windows permit emergency egress. (Double hung, casement, and sliding windows are satisfactory escape windows.)

b. The minimum clear opening area for such windows shall be at least 6 square feet and the minimum dimension shall be 24 inches unless otherwise approved.

c. Screens if provided for rescue windows shall be hinged or sliding and shall be operable from the inside with one hand, and without the use of a key or other device.

d. School authorities shall cause at least one such window in each teaching area where required to be marked by an appropriate sign identifying the rescue window.

e. Rescue window labels:
   1. bright yellow background with black letters
   2. size: 3 inches by 5 inches
   3. text: **Rescue Window** readable from each side of the window
   4. any window coverings must also have labels
   5. window operating instructions if not readily apparent

S104-8 Miscellaneous Spaces

a. Any boiler room over 300 square feet in area shall have two exits remote from each other, one of which may be by means of a ladder or through an areaway. Outside doors should swing outward to relieve explosion pressures; inside doors shall swing into the boiler room. Fire rated vestibules are required between boiler rooms and exit ways per Code.

b. Access to storage areas for gasoline powered equipment cannot be directly from the school, but must be through an outside door.

S105 DOOR HARDWARE

S105-1 Door Hardware for Classrooms and Other Spaces of Pupil Occupancy

a. Hardware on doors from spaces of pupil occupancy shall be a type which will always permit the door to be opened from the inside without direct manipulation of any type locking device.

b. Door closers are required on all doors, including classroom doors, opening onto a corridor.

c. Hold open devices if provided must be automatic per Code.

d. Electrically powered movable partitions shall be controlled by a two key, constant pressure, series wired system with control stations located on opposite sides and ends of the partition run.

S105-2 Panic Hardware

a. All exterior and interior exit doors in exitways and from all places of assembly shall have panic hardware, except:

   1. All exterior corridor doors shall have panic hardware, except those serving only one or two classrooms, or service areas (such as a boiler room, kitchen, or storage room) may have hardware in accord with S105-1.

   2. Panic hardware is not required for push-pull interior doors from places of assembly and exitways if these doors have non-latching hardware.

b. Door hardware must not interrupt perimeter seals or drop bottoms provided for acoustical reasons.

S105-3 Hardware Specifications

a. Hardware specifications should include a general definitive statement which describes the type of hardware to be used on doors from spaces of pupil occupancy, from places of assembly, and exit doors to assure compliance with S105-1 and S105-2.

b. Cash allowance type hardware specifications shall include such a statement.

S105-4 Acoustical Seals

a. Where some degree of sound isolation is needed between two adjacent spaces, doors separating these spaces should be supplied with continuous acoustical seals and automatic drop bottoms to be coordinated with panic and closure hardware. For more critical applications a laboratory-tested acoustical door assembly might be necessary. See also Part III Acoustic Environment requirements.

S106 DOORS

a. Classroom doors, stair and corridor doors shall have vision panels, and vision panels are recommended in any other doors commonly used by students or staff where privacy is not an issue.

S106-1 Exit Doors and Doorways

a. All doors that require panic hardware must swing in the direction of exit travel.

b. Permanent or removable mullions on pairs of doors are recommended.

S106-2 Door Sizes

a. No door from a space of pupil occupancy nor a single exit door shall be less than 36 inches in width nor more than 44 inches in width unless specifically approved. Each leaf of a pair of doors (i.e.no mullion) shall not be less than 36 inches nor more than 44 inches in width unless specifically approved.

b. Minimum door size from places of assembly - see S104-2c.

c. Main corridors and stair enclosures should be equipped with at least two 36" doors to facilitate student movement from class to class.

S106-3 Fire Doors

The following requirements for labeled doors pertain only to interior doors leading from the spaces mentioned. The spaces mentioned must have floor, wall and ceiling fire ratings compatible with the doors required: (for use with 8 NYCRR 155.3b7i) (See S203)

a. "B LABEL" self-closing doors and frames

1. Boiler, heater or furnace rooms (See S104-8),

2. a. Refrigeration rooms which house equipment which utilizes flammable refrigerant,

b. Electrical rooms: rooms housing transformers for which the National Electric Code requires a fire rated enclosure of less rating than that required for a transformer vault,

c. Equipment rooms: rooms housing elevator machinery, emergency generators, or equipment which utilizes any flammable liquid,

3. Incinerator rooms,

4. Store rooms for fuel, flammable liquids and gas powered equipment,

5. Transformer vaults: as required by the National Electric Code,

6. Stages (See S104-2g)

7. Basements

a) Storage rooms

b) Building service and maintenance areas - recommended

c) Openings from basements and other lower level areas to ground or first floor above

b. "C LABEL" self-closing doors and frames

1. Projection booths (See S104-2h)
2. Building service and maintenance areas (other than basements) opening on exitways - recommended
3. All doors opening on exit corridors except classroom doors.

c. All "B" label fire doors required above shall be maintained in a normally closed position. Fusible links are not permitted. Hold open devices if provided must be automatic per Code.

d. Stairway enclosures (See S109-2 & 4) and smoke stops (See S109-4) must be equipped with automatic release devices.

S107 STAIRWAYS

S107-1 General

a. There shall be at least two means of egress remote from each other from each occupied floor level including basements.

b. All stairways shall be enclosed with fire resistive materials and closed off at each floor to prevent passage of smoke and fumes through the stairway opening. See S109.

c. Stairs exiting down and continuing down past the exit shall be interrupted by appropriate means at the top of the run to the lower level.

d. There shall be no storage space under any stairs or landings unless separated from the stairway by two hour rated construction and accessed from another space or the corridor.

S107-2 Encroachment of Stairs

a. Stairs are permitted to encroach on the minimum width of corridors at exit level only if a clear passage equal to the stair width required to serve the combined exit level exits and stair, and at least 66" is provided to the exit doors. (These exit doors shall provide at least 3 door exit units.)

S107-3 Width of Stairs

a. One unit of stair width equals 22 inches. Partial units of stair width are not countable in determining required width except that a 1/2 stair unit increment of 11" is permitted.

b. One unit of stair width shall be provided for:

1. Top story: each 3,300 square feet or fraction thereof of gross area

2. Intermediate stories: each 2,400 square feet or fraction thereof of gross area

c. Stair widths shall be maintained clear and unobstructed throughout the entire length of the stairway. See handrail exceptions - S107-4.

1. Two unit (44" wide) stairs are minimum for exit stairs. Stairs wider than 44" should be considered to improve circulation.

2. A door into a stairway shall at no point in its swing reduce the effective width of the stair to less than 22", nor when fully open interfere with full use of the stair.

S107-4 Handrails

a. Continuous handrails shall be provided on both sides of stairways. For 88 inches (or more) wide stairways, center handrails shall be provided.

b. Height of handrails above and in line with risers shall be 2'-5" to 2'-8" varying up depending on the age of the pupils. Buildings serving young children may require two sets of handrails to serve adults and young children.

S107-5 Railings (Balustrades, Guardrails)

a. If railings are made up of spaced bars, etc. (rather than a solid screen), the spacing shall be such as to prevent passage of a 4 inch diameter sphere. Orientation and design of railing members shall inhibit climbing.

b. Height of balustrades for both interior and exterior stairs shall be 3'-6" above tread nosing, and 3'-6" minimum above landing floors.

S107-6 Rise/Run

a. Each stairway from story to story shall be in two or more runs with not more than 16 risers, nor less than 3 risers, per run; except that a straight run of stairs without any intermediate landing may be used for differences in floor elevations not exceeding seven feet. This does not apply to secondary or service stairs.

b. Rise, run, nosing, and surfaces shall comply with the Code and mobility impaired requirements.

b. Maximum- riser - 7 1/4".

c. Minimum tread (including nosing) - 10 1/2".

S107-7 Landings

a. Intermediate landings between runs shall be at least 44 inches.

b. Terminal landings of at least 44 inches shall be provided at the top and bottom of a run of stairs for each floor level. Such landings shall not encroach upon the width of any through corridors and should be separated from corridors by smoke barriers.

S107-8 Construction

a. All stairs and stairwells shall be built throughout of fire resistive materials. Handrails are exempt from this requirement.

b. Stair treads, risers, and landings shall be solid without perforations.

c. The nosing of all stairway treads and landings shall be constructed to provide non-slip surfaces. Contrasting colors are recommended when nosing and tread are of different materials; and the construction must provide a smooth and level tread surface.

S107-9 Secondary Stairways and Service Stairs

a. Secondary stairs are those stairs from spaces which are not required exits from the spaces.

b. Service stairs are those stairs not intended for pupil use.

c. Secondary stairs and service stairs may be less than 44 inches, but shall comply with requirements for main stairways in regard to fire resistance and, generally, in all other respects.

S107-10 Corridor Stairs

a. Full-width corridor stairs separating changes of level within a corridor length shall have the top and/or bottom riser no closer to an intersecting corridor than 44 inches.

S107-11 Exterior Steps

a. Exterior steps of more than three risers (18 inches) leading directly from a building exit, shall be provided with protection from any accumulation of snow and ice. In the case of main entrance stairs, roofs or canopies may be satisfactory in lieu of enclosures if the specific design (number of risers, location, and size of exit facility) are all found to be acceptable. Protection may not be required where accumulations of ice and snow would be removed in the normal operation of the building, such as, at the main entrance to the building.

b. Exterior steps shall have an easy rake (Riser 6", Tread 11" or better) to compensate for the hazard of ice and snow.

S107-12 Winders

a. Stairways for pupil use may not be constructed with winders. Exceptions may be made for

secondary stairways serving special areas which have limited use, such as projection booths, observatories, etc.

S107-13 Fire Escapes

a. Fire escapes are not permitted on new school buildings. (on existing school buildings covered exterior stairs shall be installed when other exits are determined to be inadequate for fire safety.) See Appendix H.

S108 RAMPS AND AISLES

a. Ramp slope shall not exceed a pitch of 1 in 12. Ramp surfaces and surfaces of auditorium aisles and other spaces having sloped floors shall be non-slip.

b. Ramps connecting floor levels shall be enclosed. See S109.

c. Ramps shall conform generally to requirements of stairways, S107, regarding widths, landings, handrails and protection from accumulation of ice and snow.

S109 SMOKE CONTROL

S109-1 General

a. Every floor of a building shall be separated from floor levels above and below by stair enclosures and smoke barriers constructed to effectively obstruct the passage of smoke and fumes.

b. Every space of pupil occupancy over 500 square feet area, including open-planned areas, must have (at least) two means of egress, each in a separate smoke zone. When such spaces do not have ready access to the building exterior, separate smoke zones shall be created by construction of smoke barriers to effectively obstruct the passage of smoke and fumes.

S109-2 Stairway Enclosures

a. All stairways shall be fully enclosed with fire resistive materials, and closed off at each floor by doors, to effectively obstruct the passage of smoke and fumes through the stairwell opening, except that:

1. with communicating secondary stairs in a two-story room with the same use on both floors, (such as a library with mezzanine) stairs may be unenclosed and the floor to floor separation achieved at the perimeter of the room on one level.

2. in buildings having three or more stairways serving corridors and building exits, one stairway may be unenclosed at the grade level.

b. Distance to exits:

1. At the grade level, the stairway enclosure door or bottom riser of an approved unenclosed stair shall be within 50 feet along the line of travel of an exterior (not vestibule) door. It is recommended that all stairs exit directly to the outside and the Commissioner may require that particular stairs do exit directly to the outside.

2. Stairways serving three or more floors shall exit directly to the outside.

c. No doors shall be permitted into stair enclosures except from corridors; and, where specifically approved, doors required for exit access.

d. The distance from the stair enclosure of one exit stairway to the stair enclosure of another exit stairway shall not exceed 240 feet along the line of travel. Distance from enclosure door opening to the first stair riser shall not be more than 10 feet except where specifically approved. Stair enclosure doors shall be at least 5 feet away from a door to a room having pupil occupancy.

e. See S109-4, Doors - Stair Enclosures and Smoke Zones.

S109-3 Smoke Zones (smoke barriers, smoke stops)

a. Smoke barriers required to divide a building into separate smoke zones shall be constructed of fire resistive materials of such design and detail to effectively obstruct the passage of smoke and fumes.

b. Location of Smoke Barriers:

1. Buildings in which all spaces of pupil occupancy have access to usually accepted secondary means of exit into separate smoke zones (such as access to the exterior through escape windows) will generally not require smoke barriers, other than for separation of major building elements or as required by Code.

2. Smoke barriers are required to create separate smoke zones for spaces of pupil occupancy which would not have usually accepted exits into separate smoke zones, interior spaces of pupil occupancy and interior courts required for exiting (i.e., with escape windows to the court).

3. Smoke barriers and smoke zones may not be required where one of the required means of exit is directly related to an exterior door, stair enclosure, approved protected exit passageway, or other approved smoke zone.

4. Interior places of assembly not having approximately one-half of the required exit units within 50 feet of exterior doors, require smoke stops located so that approximately one-half of the required exit units are into separate smoke zones.

5. Major building elements of a total building complex shall be separated into individual smoke zones. Approximately 30,000 square feet will be used as a guideline - not necessarily a maximum.

6. Open-planned (undivided) areas shall be restricted in size, using approximately 30,000 square feet as a guideline - not necessarily a maximum. See S103-1e & S106.

7. Smoke stops can generally be located at intersections of corridors to provide the desired separation and with door swings which avoid dead end pocket conditions.

8. Extent and continuity of smoke barriers must be designated on preliminary plans and indicated, again, on drawings submitted for final approval so that the completeness and integrity of a smoke zone can be determined.

9. See Section 109-4, Doors - Stair Enclosures and Smoke Zones.

S109-4 Doors - Stair Enclosures and Smoke Barriers

a. Doors, sidelights, and frames for stair enclosures and in smoke barriers shall bear the appropriate fire rating label.

b. Doors shall be metal, metal covered, approved treated wood construction, or solid bonded core wood doors not less than 1 3/4 inches thick. They shall be self-closing and shall close the opening completely with only such clearance as is necessary for proper operation.

1. Glazing in doors, sidelights, and frames shall be safety glazing and display the safety and fire rating etched into the surface. See S104-1.

2. Doors shall swing in the direction of egress with no latching or locking devices unless operated by panic hardware. Double-acting hinged doors are not permitted. Double egress doors which are not on automatic hold open devices are not permitted. Corridor pockets opposing the swing of doors shall not exceed a depth of 1 1/2 times pocket width.

3. It is required that stairway enclosures, and smoke barriers continue to the underside of construction above. A minimum 3/4 hour fire resistance rating, with "C" label opening protective, with latching hardware is required per Code.

c. Automatic Door Release: Approved automatic release devices, whereby upon interruption of an electrical circuit the door is released and becomes self-closing, shall be provided on stair enclosure doors, and doors in corridors and from places of assembly which are in smoke barriers.

1. The electric circuit shall be positively interrupted by activation of the building fire alarm, and shall incorporate an approved smoke detection system on the occupied side(s).

2. Door closers which incorporate an integral hold-open feature are not permitted.

d. Fusible links shall not be used to hold doors open.

e. Doors in smoke barriers shall be self-closing and maintained in a normally closed position and shall bear a sign on each side in at least 2 inch high letters reading, "Smoke Door-Keep Closed" (unless held open by an automatic door release).

1. See Section 109-4b, & 4b.1.

S110 FIRE CONTROL

S110-1 Fire Protection Equipment

a. Fire extinguishers shall bear the Underwriters Label and shall be set in recesses flush with the corridor wall just above the base at such locations that no point in the corridor, lobby, or stairs shall be more than 75 feet from an extinguisher.

b. Fire extinguishers shall also be placed convenient to the stage of the auditorium, in shops, homemaking rooms, chemistry labs, kitchens, boiler and incinerator rooms, and in other places which can be considered a probable source of fire.

c. Fire extinguishers shall be of the type most suitable for the kind of fire expected in an area.

d. If hydrants of a municipal water system are available, standard fire hydrant facilities shall be installed in accordance with S404.

e. Sprinklers shall be installed on the stage of all auditoriums using fly scenery.

S110-2 Additions

a. Additions must comply with all requirements of Code and Regulation. If the addition can bring an existing building into conformance with Code and Regulation it should do so.

b. Passages or corridors connecting buildings to each other must meet all dead end restrictions of Code and Regulation.

c. Buildings of differing fire-resistive construction shall be connected by protected openings in two hour fire rated construction.

d. Vestibules of non-combustible construction are required at building exits from Class A buildings before entering a building or passage of combustible construction.

e. Fire areas as determined by Code shall apply to the aggregate areas of inter-connected buildings unless separated by fire walls. Smoke separations may be required in inter-connected buildings per Code even if the total building area is permitted by fire area calculations.

f. see also S104-4 Courts.

S110-3 Building Location

a. The location of a building should be such that fire apparatus can serve all points of the building.

S110-4 Fire Stopping

a. Concealed spaces within wall, partition, floor, interstitial space, or stair construction shall be fire stopped, or filled with noncombustible material to prevent the passage of flame, smoke, fumes, or gases per Code.

S110-5 Projection Booths

a. Automatic fire shutters capable of manual operation shall be provided for all operating and observation openings in booths where other than "safety" film is used.

S110-6 Stage Storage

a. Storage of scenery and equipment in space underneath the stage is not recommended.

S110-7 Fire Blankets

a. Fire blankets for smothering clothing fires should be available in all areas where students are exposed to the hazards of any equipment having an open flame.

S111 PROVIDING FOR PERSONS WITH HANDICAPPING CONDITIONS

a. Starting with the preliminary design stage, consideration shall be given to the needs of persons with handicapping conditions who may be using the building. The building should be designed so that they have easy access to it, and so that, once inside, they can move about and use the facilities as readily as those without handicaps. See Appendix J.

S112 ACCIDENT PROTECTION

S112-1 Window Cleaning Safety Device

a. Persons engaged in window cleaning shall be protected. Windows shall be cleaned from approved safe surfaces, window sills or ledges, ladders, boatswains' chairs, or scaffolds, all as defined in 12 NYCRR 21.

b. A safe surface is where the cleaner is working not over 6 feet off the floor (or grade) and not over 3 feet above stair run.

c. Ladders may be used generally when the top of the window is not over 35 feet above grade (or floor).

d. Window sills and ledges may be used when the window openings are provided with approved anchors for use with safety belts.

e. Approved boatswains chairs and scaffold also may be used.

S112-2 Shower Room Areas

a. Shower rooms shall be designed to prevent water from being tracked into locker rooms. Where possible, curbs should be eliminated by proper location of drains.

b. Consideration beyond handicapped accessibility requirements should be given to the installation of grab bars in shower rooms.

PART II

MATERIALS

S201 GENERAL

a. Selection of all materials and finishes shall be made with consideration for assuring fire safe conditions, life-cycle costs, recyclability, economical and efficient operation and maintenance, and consideration of favorable fire insurance rates.

b. Materials shall be selected and specified with the specific goal of promoting health and safety for building occupants. Consideration must be given to choose materials proven to have low emissions of volatile organic compounds and limited production of particulate matter over their projected life-cycle.

S202 INTERIOR FINISH

a. Interior finishes are materials applied directly to walls, fixed or movable partitions, ceilings, and exposed interior surfaces of a building, etc., as well as the exposed finish of construction materials. Such finishes may provide decorative treatments and visual environment (see Part III-V), sound control (see Part III- Acoustic Environment requirements), thermal insulation (see S207), and sanitation. In all cases, interior finishes must be selected to reduce contribution to propagation of fire.

S202.1 Fire Hazard Classification

a. The Fire Hazard Classification of a finish material provides data in regard to flame spread, fuel contributed, and smoke developed. Interior finish materials shall be classified in accordance with the recognized standard test in which asbestos cement board rates 0 on a scale and red oak lumber, 100. ASTM E-84, NFPA-255, UL-793.

1. Class A Finish - flame spread 0-25; Any material classified at 25 or less, and any element thereof which, when so tested, shall not continue to propagate fire.

2. Class B Finish - flame spread 25-75.

3. Class C Finish - flame spread 75-200.

4. Class D Finish - flame spread 200-500.

b. Combustion produces smoke, acrid fumes, toxic products, carbon monoxide, and oxygen deficiency, as well as heat and flame. Carbon monoxide and oxygen deficiency present the greatest life hazard, although lethal concentrations of toxic products may occur. The chief hazard of smoke is reduced visibility; however, the psychological, panic producing factor of a smoke-filled area cannot be overlooked.

c. Regardless of the flame spread classification, no material having a smoke developed rating of 450 or more shall be used, and any material having a life hazard greater than that indicated by the flame spread classification because of the amount and character of combustion products generated, shall be included in a lesser classification appropriate to its actual hazard, as determined by the Commissioner.

S202-2 Limitation of Use of Interior Finishes

a. Interior finishes include, but are not limited to veneer, wainscotting, paneling, and plastic wall coverings. For the purpose of this manual paint finishes, paper and wood veneers not more than 1/28 inch thick (.035"), trim less than 6 inches in width, solid bonded core wood doors, and floors are not deemed to be interior finish.

b. Interior finish in school construction shall be Class A, B, or C, except as set forth below. (Class D interior finish shall not be used in school construction.)

c. Class C interior finish shall not be used in school construction of more than three stories.

d. Class A or B interior finish shall be used in the following locations:

1. Corridors, passageways, and stairways. (exitways)
2. Kitchens.
3. Storerooms. See S202-6-b for basement storerooms.
4. Maintenance and repair areas and custodial spaces.
5. Places of Assembly and Stages,except wainscots not over 8 feet above floor may be Class C.

S202-3 Attachment of Interior Finish

a. Interior finish shall be fastened or cemented in place so as to not be readily loosened when subjected to a room temperature of 400°F for 30 minutes.

b. Interior finish 1/8" or less in thickness shall be applied directly to fire resistive base construction, such as walls, or to fire resistive backing applied as in "c" below.

c. Interior finish shall be applied directly to fire resistive base construction, such as walls, or to wood furring strips of not over 1 3/4" nominal thickness fastened to fire resistive base construction. The furred space between finish and base material shall be filled with fire resistive material or fire stopped at least 10 feet on center in both directions.

Note: Wood and plywood paneling may be used when applied to fire resistive base construction as above providing the fire hazard classification *of the paneling* is as herein specified.

S202-4 Sanitary Interior Finishes

a. Food storage, preparation, and serving areas, toilet rooms, shower, and locker rooms, and similar areas shall have appropriate non-absorbent, impervious floor, ceiling and wall surfaces which will facilitate cleaning.

b. In such areas which are subject to water spillage and flush type cleaning, attention must be given to the provision of, and location of floor drains.

S202-5 Curtains and Draperies

a. The board of education and architect shall be responsible to ascertain that all blinds, curtains, fittings, and draperies are fire resistive or flame retardant, whether included in the principal contracts or purchased later as equipment. The board shall maintain and renew safety treatments as required.

S202-6 Fire Retardant Paint

a. Fire retardant paint shall not be used as a means of protecting combustible assemblies where fire resistive materials or assemblies are required.

S203 FIRE RESISTANT (RATED) CONSTRUCTION (See S104-8 and S106-3)

a. Walls, floors, and ceilings of the following spaces shall be of construction having at least the fire resistance ratings listed below, with non-combustible finish. Those spaces having a roof over the entire space may have roof construction (and ceiling) of non-rated fire resistive materials.

b. Two (2) hour construction:

1. Boiler, heater or furnace rooms (See S104-8),

2. a. Refrigeration rooms which house equipment which utilizes flammable refrigerant,

b. Electrical rooms: rooms housing transformers for which the National Electric Code requires a fire rated enclosure of less rating than that required for a transformer vault,

c. Equipment rooms: rooms housing elevator machinery, emergency generators, or equipment which utilizes any flammable liquid,

3. Incinerator rooms,

4. Store rooms for fuel, flammable liquids and gas powered equipment,

5. Transformer vaults: as required by the National Electric Code,

6. Stages (excluding proscenium opening) over 1,000 square feet

7. Basement storage areas

8. Separation of basement and other lower level areas from floors above - recommended.

c. One (1) hour construction:

1. Projection rooms

2. Stairway enclosures and smoke stops

3. Building service and maintenance areas

S204 HAZARDOUS GLASS (GLAZED) AREAS

S204-1 Glazed Panels and Doors

a. Safety glazing is required in the following locations in normally occupied areas, unless railings or grilles are provided which will provide comparable protection from accidents due to physical contact:

1. All glazing within 18 inches of the floor (or platform level of music room-type risers),

and additionally,

2. All glazing within 48 inches of the floor in corridor walls, including classroom doors, exit doors and sidelights.

3. All glazing in areas where educational use may cause physical abuse, such as gymnasium, and playrooms.

b. Acceptable safety glazing materials shall be at least 1/4" tempered (heat treated) glass, 1/4" laminated safety glass, or approved plastic materials. 1/4" thick wire glass or other approved fire rated glazing material may only be used in an approved rated frame system where a fire rating is required.

S204-2 Marking of Glazed Doors and Sidelights

a. Glazed doors and sidelights within 6 feet of such doors shall be marked by appropriate means in accord with 12 NYCRR 47, except marking on door and or sidelight is not required:

1. Where less than 80% of the area of the door or sidelight above a reference line 18 inches above the floor is glazed

2. Where width of sidelight is not more than 20 inches, with 1 3/4 inch minimum opaque stiles

3. Where floor treatment out 3 feet from a sidelight will deter approach (pools, planters, etc.)

4. Where sidelights are supported on 18 inch minimum height opaque sill and wall construction

5. Where sidelights are protected by approved 18 inch minimum height permanent barriers extending across at least two-thirds of the sidelight (benches, planters, guardrails, etc.).

S205 PLASTICS

S205-1 General

a. Plastic materials are commonly used in building construction. Many existing test procedures have been disputed as not being indicative of the reaction of a given material to actual fire conditions. Plastics are organic and must be considered as combustible. The industry is improving the characteristics of plastics under fire conditions and there are on-going studies of development of improved testing programs. Until such time as new tests are developed and accepted, plastic materials for public school construction shall meet the tests indicated in this section.

b. Where specific standards are not set forth below, they shall conform to minimum accepted standards established by the Commissioner.

S205-2 Specifications for Plastics

a. Where plastic materials are incorporated into construction, the plans and specifications shall require that each type plastic material meet the specific tests indicated in the following sections.

Plans and specifications not meeting this criteria will not be approved.

b. Any plastic material failing to meet the indicated tests shall not be used.

S205-3 Limitations of Use

a. Until such time as newer tests are developed and accepted, plastic materials shall meet the test criteria indicated in the following sections. Additional testing in accord with procedures prescribed by the Commissioner may be required when the behavior of a plastic material or assembly under fire conditions remains questionable.

b. No plastic material shall be used which has a smoke developed rating of 450 or more when tested in accordance with ASTM E-84, or a smoke density rating of 75 or more when tested in accordance with ASTM D-2843.

c. Plastic materials shall meet the following test criteria in accordance with Table 205-3, on page 2.11.

1. ASTM E-84, Surface Burning Characteristics of Building Materials: flame spread rating shall not exceed 0-25; smoke developed rating shall not exceed 450.

2. ASTM D-635, Flammability of Self-Supporting Plastics: burning test shall not exceed 1.5 inches per minute.

3. ASTM D-1929, Ignition Properties of Plastics: self-ignition shall not occur below 600°F.

4. ASTM E-108, Fire Tests of Roof Coverings: material shall pass the Class A burning brand test.

5. ASTM D-648, Deflection Temperature of Plastics Under Flexural Load: materials shall remain in place 15 minutes at 175°F. and fall from frame at 200° below ignition temperature.

6. ASTM D-2843, Standard Method for Measuring Density of Smoke from Burning or Decomposition of Plastics: smoke density shall not exceed 75.

S205-4 Interior Finish and Trim--Plastic

a. Plastic materials for interior finish and trim shall be in accordance with Section S202.

S205-5 Insulation--Plastic

a. Plastic insulation materials shall be in accordance with Section S207.

S205-6 Glazing With Plastics

a. Doors, sash and framed openings may be glazed with light transmitting plastic materials, where such openings are not required to be fire-rated and do not form required smoke barriers, when in accordance with the following limitations:

1. Maximum area of uninterrupted plane surface of the wall face of the story in which installed 50%

2. Maximum area of a single pane of glazing ..... 12 sq. ft.

3. Maximum height of a single pane of glazing ..... 4 feet

4. Maximum area of a combination of plastic assemblies, i.e., glazing and/or wall panels ..... 500sq. ft.

5. Minimum separation with fire resistive materials of #4 above, and vertically between floors ..... 4 feet

6. Where extensive plastic glazing is used relative to the wall area of a single room, interior smoke venting may be required.

b. Plastic materials used for glazing shall meet the following tests. See S205-3c.

1. ASTM D-635

2. ASTM D-1929

3. ASTM E-84 re: smoke developed; or D-2843

c. Interior plastic glazing shall be in conformance with Section S202.

d. Plastic glazing (which may reduce glass breakage) is generally subject to scarring from physical abuse and burning. Also, high impact acrylics may create entry and venting difficulties for fire fighters. The use of such plastic glazing should be considered only where it is determined to be practical.

S205-7 Wall Panels--Plastic

a. Exterior plastic wall panels of a single sheet or an assembly of sheets, used as light transmitting media or as surface veneer, may be installed when in accordance with the following limitations:

1. Maximum area of uninterrupted plane surface of the wall face of the story in which installed 50%

2. Maximum area of a combination of plastic assemblies, i.e., glazing and or wall panels ..... 500 sq.ft.

3. Minimum separation with fire resistive material of #2 above and vertically between floors ..... 4 feet

4. Where extensive plastic panels are used relative to the wall area of a single room, interior smoke venting may be required.

b. Plastic materials used for wall panels shall meet the following tests. See S205-3c.

1. ASTM D-635

2. ASTM D-1929

3. ASTM E-84 re: smoke developed; or D-2843

c. Interior plastic wall panels shall be in conformance with Section S202.

S205-8 Roof Panels--Plastic

a. Roof panels of a single sheet or an assembly of sheets of light transmitting plastic materials may be installed when in accordance with the following limitations.

1. Maximum area of individual plastic assembly . . . . . 200 sq. ft.

2. Maximum aggregate area of plastic assemblies of area of room below 25%

3. Minimum separation of assemblies . . . . . 4 feet

4. Where roof panels incorporate smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, the area limitations of #1 and #2 above do not apply.

b. Plastic materials used for roof panels shall meet the following tests. See S205-3c.

1. ASTM E-84 (interior exposure)

2. ASTM E-108 (exterior exposure)

3. ASTM D-1929

S205-9 Skylights--Plastic

a. Domed skylight units, and related ceiling panels of light transmitting plastic materials may be installed when in accordance with the following limitations.

1. Exterior dome profile shall rise above the mounting flange a minimum of 10% of the maximum span, but not less than 5 inches.

2. Maximum area of individual plastic assembly . . . . . 200 sq. ft.

3. Maximum aggregate area of plastic assemblies of area of room below 25%

4. Minimum separation of assemblies . . . . . 4 feet

5. Minimum curb height . . . . . 6 inches

6. Where skylights incorporate smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, the area limitations of #2 and #3 above do not apply.

b. Plastic materials for skylights shall meet the following tests. See S205-3c.

1. ASTM D-635

2. ASTM E-84 Re: smoke developed or D-2843.

c. Interior ceiling panels shall be in conformance with Section S202.

S205-10 Light Diffusing Ceiling System

a. Light diffusing ceiling systems and lighting fixture diffusers of light transmitting plastics which meet the following tests, may be used. See S205-3c.

1. ASTM D-635

2. ASTM D-648 - only when aggregate area of plastic exceeds 30% of the ceiling area of the room.

3. ASTM E-84 or D-2843 re: smoke developed.

S205-11 Greenhouse-Type Enclosures--Plastic

a. Plastic materials for greenhouse-type or swimming pool enclosures may be installed when in accordance with the following limitations.

1. Wall materials shall conform to S205-7b.

2. Roof materials shall meet the following tests. See S205-3c.

(i). ASTM E-84 (interior exposure)

(ii). ASTM E-108 (exterior exposure)

(iii). ASTM D-1929

3. Where the roof assembly incorporates smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, flame spread in accordance with ASTM E-84 is not required. Conformance regarding smoke in accordance with ASTM E-84 or D-2843 is required.

b. Such enclosures shall not occur directly adjacent to, or below fresh air or window openings in the main building and shall be separated from the main building by 1 1/2 hour fire rated construction with 1 1/2 Class B doors.

S205-12 Awnings, Canopies--Plastic

a. Plastic materials for exterior assemblies such as awnings and canopies (other than at fire escapes) may be used without limitation, provided that such assemblies do not occur immediately adjacent to or below fresh air or window openings in the main building.

S205-13 Specialty Items, Furnishings--Plastic

a. Plastic specialty items (such as waste baskets, tote trays and foam rubber athletic landing mats) and plastic furniture (such as shelving, desks and bean-bag chairs) are combustible; some dangerously so. They add substantially, and many times needlessly, to the fire load of a building.

b. Flammability, fuel contribution and smoke considerations most be carefully investigated during the selection of such specialty items and furnishings. Fire test criteria and test results should be required of the manufacturers prior to purchase. Items of obvious and questionable hazard

avoided.

TABLE 205-3

TESTS FOR PLASTICS

	ASTM E84			ASTM D2483	ASTMD 635	ASTM D648	ASTM D1929	ASTM E108
	0-25 flame spread	25-75 flame spread	smoke developed not over 450	smoke density not over 450	burning rate not over 2.5 inches	remain in place 15 min. @ 175°F. and fall @ 200°F. below ignition temp.	self-ignition temp. not over 600°F.	class A burning brand
Ceiling Systems			X	X	X	X		
Ducts	X		50					
Furniture and Specialties	*		*	*			*	
Glazing			X	X	X		X	
Insulation: Building	X	X	X	X				
Insulation: Pipe/Duct	X		X	X				
Roof Panels	X		X	X			X	X
Skylights			X	X	X			
Wall Panels			X	X	X		X	

Plastic toilet partitions see furniture and specialties above.

* recommended

S205-14 Carpeting

a. Carpeting may be effective in controlling the reflection of some frequencies of sound. Its use for this purpose may be considered. See S208 and Part III Acoustical Requirements.

b. Air out the carpeting 2-3 months before it is installed. This can be done by unrolling the carpet, spreading it out, and storing it in a warm place. EPA studies show that peak emissions from new carpet drop after two months.

c. Allow for a 30-day ventilation/cook out period before occupancy with maximum ventilation. Allow for a longer period if there is any irritation to the eyes, throat or lungs.

d. Adhesives used to install the carpeting should be used as sparingly as possible. The district can request a Material Safety Data Sheet (MSDS) from the manufacturer that will provide information on the hazards of the adhesive and safe handling procedures. Use low odor, low solvent adhesives.

S207 THERMAL INSULATION

S207-1 General

a. Use of thermal insulation is essential in school buildings; not only to contribute to a suitable thermal environment in the various areas, but equally important, to reduce energy consumption and aid with efficient utilization of energy resources.

b. Insulation materials should provide maximum insulating values consistent with a value analysis of initial installation costs and long-term reduction of operating costs.

S207-2 Insulation Materials

a. Insulation materials for rigid and semi-rigid composition board and fiber board, and for blankets, batts, fill and pellets, including surfaces and wrappings, shall be UL listed and have a flame spread of not over 75 in accordance with ASTM E-84. See S202-1.

b. Expanded Plastic Foam: Plastic foam insulation materials must be considered very combustible and existing test procedures are not necessarily indicative of a material under actual fire conditions. Plastic foam insulation materials may be used which are UL listed and have a flame spread of not over 75, and fuel contributed of not over 100 in accordance with ASTM E-84. Such materials shall be completely covered, including edges, by inherently non-combustible materials.

1. Section S205-1, -2 and -3 apply to this section.

S208 FLOORS AND FLOOR COVERING

S208-1 General

a. Floors present large exposed areas of interior finish; however, experience with actual fires throughout the country generally does not indicate a serious life hazard due to flame spread on floor surfaces. Floor coverings must, however, be considered in regard to their contribution to fuel load of a given area and any material or finish which creates an obvious fire hazard must be avoided.

S208-2 Floor Finishes

a. Finishes on floors shall minimize the possibility of slipping. Consideration must be given to high traffic and high activity areas such as corridors and stairs, gymnasiums, and places of

assembly, as well as potential wet areas such as shower, drying, and locker rooms, swimming pool decks, toilets, kitchens, and entrances.

S208-3 Floor Covering

a. Carpeting, manufactured of many natural or synthetic products and numerous combinations, is available. Caution must be exercised in the purchase of a particular type of carpeting with consideration and guarantees from the manufacturers regarding limitation and control of delamination, color retention and fading, microbial growth, outgassing, cleanability, flammability and smoke propagation, not only of the carpet, but also the backing and adhesives. Carpet and backing must have less than .45 watts Critical Radiant Flux (CRF) and at minimum must meet the methenamine pill test, (ASTM D-2859, DOC-FF1-70).

PART III

ENVIRONMENT

S300 GENERAL

a. Although focused on teaching and learning, education must also address the need to maintain a safe, secure, and healthy school environment. The capacity of children to learn is impeded if their school environment contains elements which are hazardous to their health. The State Education Department and educators throughout the State of New York have a responsibility to assure the school community and the public that, based on the best available knowledge, school buildings are safe, healthy, clean and in good repair.

In December 1994, the New York State Board of Regents adopted the following guiding principles developed by the Regents Advisory Committee on Environmental Quality in Schools:

i. Every child has a right to an environmentally safe and healthy learning environment which is clean and in good repair.

ii. Every child, parent, and school employee has a "right to know" about environmental health issues and hazards in their school environment.

iii. School officials and appropriate public agencies should be held accountable for environmental safe and healthy school facilities.

iv. Schools should serve as role models for environmentally responsible behavior.

v. Federal, State, local, and private sector entities should work together to ensure that resources are used effectively and efficiently to address environmental health and safety concerns.

b. The environment of a facility is a prime element in the learning process. To be successful, it must carefully blend and balance of many considerations. Students and teachers must be able to see and hear clearly, and be comfortable and healthy. The various visual and mental tasks, natural and artificial lighting, brightness, glare, room proportions, wall colors and finishes, furnishings, ergonomics, and the ability to demonstrate and use equipment are some of the many things that must be considered.

S301 ACOUSTICAL ENVIRONMENT

S301-1 Acoustical Environment

a. Proper control of sound in a learning and teaching facility is of critical importance for allowing good aural communication between teachers and students, as well as for achieving the intended usage of a space (such as an Auditorium).

b. Control of sound is achieved in three ways: 1) Room acoustics - creating an interior environment that fosters the projection or suppression of sound (depending on the room's individual requirements), 2) Sound isolation - selecting appropriate wall, floor, ceiling and door constructions to prevent undesirable noise in adjacent areas from transmitting into the space and 3) Mechanical Noise Control - ensuring that the noise produced by the mechanical HVAC and

plumbing systems is attenuated to a level appropriate for the space that these systems serve.

c. The following items are basic guidelines for achieving acoustic control in a school building. For more detailed information, an acoustical expert should be consulted.

S301-2 Room Acoustics

a. When selecting finishes for teaching spaces, a proper balance between sound-absorptive and sound-reflective materials is necessary to produce an environment that is not overly reverberant (reducing intelligibility of speech) nor excessively "dry" (results in an unnatural, uncomfortable feeling for most occupants).

b. Classrooms and meeting rooms should have an acoustic ceiling with a minimum Noise Reduction Coefficient (NRC) rating of 0.65. Carpet on floors will absorb some sound, but should mainly be considered for control of footfall noise. Walls typically should be a hard, sound-reflective material, such as gypsum board or concrete masonry units.

c. Corridors should have the same requirements as classrooms for the ceiling. Carpet is a very effective means of reducing footfall noise in the corridors, and should be considered when possible. High-traffic corridors built completely with hard materials (e.g., gypsum walls & ceilings, VCT floor) will almost certainly result in a build up of sound that could be intrusive on adjacent sound-critical rooms.

d. Sound-critical spaces such as auditoriums, music rooms & lecture halls will require special consideration for room finishes and shaping of walls & ceilings in order to achieve good projection and balance of sound energy. A specialist in acoustics should be consulted for these areas whenever possible.

S301-3 Sound Isolation

a. Walls separating classrooms/meeting rooms should be a minimum construction of two layers of 5/8" gypsum board on one side of a metal stud and one layer of 5/8" gypsum board on the other. Two-inch thick, 3 lb/ft^3 density unfaced batt insulation should be placed in the stud cavities. Joints on the two layer side should be staggered, and the perimeter of the walls at the top and bottom should be caulked on both sides with a non-hardening acoustical sealant. These walls should also extend all the way up to the underside of the slab or deck of the floor above.

b. For improved sound isolation between rooms that produce sound louder than average speech levels, the above construction should be supplemented with an additional layer of 5/8" gypsum board on the single layer side, and changing the metal studs from a single to a double staggered or separated configuration.

c. Corridor walls at classrooms or meeting rooms should be a minimum of a single layer of 5/8" gypsum board on each side of a metal stud, with two-inch thick, 3 lb/ft^3 density unfaced batt insulation placed in the stud cavities. For further improvements in sound isolation (e.g., for rooms located off of high-traffic corridors), the construction listed in S301-3a may be used.

d. Doors should typically not be located between two spaces deemed to be sound-critical. Also avoid facing two doors directly across from each other in the corridor. Where noise from a corridor is a concern, doors should be a minimum construction of solid-core wood or hollow metal with applied acoustical door seals and sweeps to control sound leakage around the perimeter of the doors. The seals and sweeps used should ideally be manufactured specifically

for control of sound.

e. Where exterior noise exists outside of a sound-critical space, the windows should be specified as an insulating assembly with different pane thicknesses (e.g., 1/4" pane - 1/2" airspace - 3/8" pane). Laminated glass may be used for either or both panes to further improve sound isolation.

f. Intersections of walls with roof decks above should be sealed air-tight. With block walls, grout the void between the top course of block and the deck. For gypsum board/stud partitions intersecting metal deck, pack loose fiberglass insulation in the deck flutes at the top of the partition.

g. Acoustically sensitive spaces require specialized partition constructions and selection of doors and windows. The designer should defer these selections to an acoustic specialist.

S301-4 Mechanical/Electrical Noise Control

a. Achieving the proper level of ambient noise in an academic space is critical. If the level is too high, communication between teachers and students will be partially or fully masked. If too low, the slightest noises (pencils dropping, rustling of papers, etc.) will appear to be intensified in their level of disturbance. Listed below is a table of ambient noise criteria based on the single number room criteria "RC" curves. The values and ranges are based on judgment and experience, not on quantitative evaluations of human reactions. They represent general limits of acceptability for typical building occupancies. Higher or lower values may be appropriate and should be based on a careful analysis of economics, space usage and user needs. They are not intended to serve by themselves as a basis for a contractual requirement.

Table 301-4 Design Guidelines for HVAC System Noise in Unoccupied Spaces

Space	RC Level
Classrooms	30-35 (max)
Lecture Halls/Large Classrooms for more than 50 (unamplified speech)	30-35 (max)
Lecture Halls/Large Classrooms for more than 50 (amplified speech)	35-40 (max)
Libraries	30-40
Gymnasiums/Natatoriums	40-50
Laboratories (minimal speech communication)	45-55
Laboratories (extensive telephone use, speech communication)	40-50
Laboratories (group teaching)	35-45
Theaters/Auditoriums	20-25 (max)
Music Teaching Studios	25 (max)
Music Practice Rooms	35 (max)
Halls, Corridors, Lobbies	35-45
Private Offices	25-35
Conference/Meeting Rooms	25-35
Open-Plan Offices	30-40

b. Locations of mechanical and electrical equipment rooms should be carefully chosen to not have an adverse impact on the ambient noise level in the spaces above. To avoid excessive vibration of the building structure by mechanical air-handling units, chillers, compressors, transformers, etc., locate equipment rooms on grade whenever possible. Rooftop units, while having certain economical benefits, require very complex and costly solutions to eliminate noise and vibration, and should be avoided whenever possible near sound-critical rooms.

c. Noise attenuation and vibration isolation should be achieved for piping and ductwork through the use of vibration isolation hangers/mounts, flexible sleeves and joints, internal acoustic duct lining and sound attenuators.

d. Avoid routing main ductwork and piping over classrooms and other sound-critical spaces. Route ducts in the corridors and tap into each room separately. Ductwork serving highly sound-critical spaces (such as an Auditorium) should not be routed over any other noisy spaces after leaving the equipment room.

e. Penetrations of sound-critical partitions by ductwork, piping and conduit should be sealed airtight with acoustical caulking (fire-rated, where necessary). Resilient sleeves should be used for large ductwork and piping as they pass through a partition.

f. When locating electrical receptacles for switches and outlets, no back-to-back boxes should be installed in two adjacent sound-critical rooms. Offset boxes at least two stud cavities from each other, and connect boxes with flexible conduit.

S302 INDOOR AIR QUALITY

reserved

S303 TECHNOLOGY

reserved

S304 VISUAL ENVIRONMENT

S304-1 Lighting

a. Adequate levels of illumination--which may be a combination of artificial and natural light--shall be provided, consistent with efficient energy utilization, for the various visual tasks being performed in each area of the facility. See S803 and Table S803-1 for artificial lighting requirements.

S304-2 Brightness Differences

a. Visual comfort depends not only upon ample light (foot candles) but also upon reasonably low brightness difference between various surfaces within the visual field.

b. A high brightness difference, or contrast, between the particular object being viewed and its immediate background is desirable. Examples are: the difference in brightness between printed words and the page on which they are printed; and, the difference between the thread and the cloth on which the stitching is done. High brightness differences within the remainder of the visual field should be limited. Examples are: book and desk; or book and walls or ceiling; or light sources viewed against adjacent surfaces.

c. Brightness ration should meet the criteria of Table S304-3.

S304-3 Window Design and Arrangement

a. To provide a comfortable feeling for the room occupants and to provide eye relief through a substantial change in focusing distance, each room used by students must be designed to allow a view to the exterior (not just sky), in accordance with Tables S304-3 & S304-5.

TABLE S304-3

RECOMMENDED LIMITS OF BRIGHTNESS RATIOS

Between	Ratio
a. Central Visual Field (the task) and immediately adjacent surfaces, such as between task and desk top, the task being the brighter surface	3:1
b. Central Visual Field (the task) and the more remote darker surfaces in the Surrounding Visual Field, such as between task and floor	10:1
c. Central Visual Field (the task) and the more remote brighter surfaces in the Surrounding Visual Field, such as between task and ceiling	1:10
d. Surfaces in the Surrounding Visual Field and adjacent luminaries or windows	1:20

S304-4 Window Requirements

a. Vision strips shall be provided in accordance with Table S304-4.

1. Length of vision strip shall be at least 50% of the lineal length of an outside wall of the room, and

2. Head of windows shall be at least 72 inches (6'-0") above the floor, and

3. Stool (interior sill) height of windows shall not exceed 32, 44, or 60 inches in accordance with Table S304-4.

b. Exceptions to the requirements of Table S304-4 may be granted if it can be shown by written application, that the educational program warrants an exception. In such cases, one or more fixtures in an area may be required to be continuously "on", wired from the exit light circuit.

TABLE S304-4

WINDOW REQUIREMENTS

Space	Max. Stool Height (inches)	Vision Strip Req'd	Vision Strip Recom'd	Daylight Required	Daylight Recom'd	Daylight Not Req'd
Administration	--				X	X
Art & Drawing	40	X				
Audio Visual	--					X
Auditorium						X
Boiler Room	--				X	X
Business						
Sec. & Office Practice	32	X			X	X
Typing	32	X				
Cafeteria	--		X	X		
Classrooms						
Academic (Secondary)	32	X				
Elementary	32*	X				
Computer Rooms						
Conference	--		X		X	X
Corridors	--			X		
Guidance	--		X		X	X
Gymnasium	--			X	Skylights	
Health	--				X	X
Home and Careers	40	X				
Incinerator Room	--					X
Kitchen			X		Skylights Clerestory	X
Large Group Instruction						X

* 30 inches recommended

TABLE S304-4
CONTINUED

Space	Max. Stool Height (inches)	Vision Strip Req'd	Vision Strip Recom'd	Daylight Required	Daylight Recom'd	Daylight Not Req'd
Library- up to 2000 sq. ft.	44	X				
Library- over 2000 sq. ft.	--		X		X	X
Office & Workroom	--				X	X
Conference	--				X	X
Music						
Elementary	32	X				
Junior H.S.	32		X	X		
Jr.-Sr. & Sr. H.S.	40		X	X		
Pantry, Serving	--				X	X
Pupil Activity	--				X	X
Science Rms. (All)	40	X				
Shops/Technology						
Agriculture	60	X				
Ag. Recitation	40	X				
General	60	X				
Vocational	60	X				
Shower & Locker Rm.	--			X	skylights clerestory	
Stairways, Pupil	--			X		
Store Room	--				X	X
Study Hall	32	X				
Swimming Pool	--			X	skylights clerestory	
Teachers Room	--				X	X
Television Studio	--					X
Toilets	--				X	X

* 30 inches recommended

S304-5 Separation of Window Walls

a. Distance between walls having classroom windows shall be such as to enable a substantial change in eye focusing distance. The minimum separation shall be 30 feet; however, distance in excess of this is recommended.

b. Walls of non-teaching spaces having windows (and walls with no windows) shall have a usual minimum separation of 15 feet.

S304-6 Window Arrangement

a. Classroom orientation may be in any direction; however, east and west orientation is preferred, particularly for elementary schools.

b. Glazed areas should be placed and arranged to minimize brightness differences. Direct view of the sky or of bright exterior surfaces produces glare and should be avoided.

c. Glare can be controlled by:

1. Limiting of window height

2. Use of tinted or polarized glass

3. Extension of roof overhangs

4. Installation of venetian blinds or drapes

5. Use of foliage

S304-7 Skylights

a. Skylights may be used to provide natural light in those spaces where a vision strip is not mandatory but natural light is required.

b. See Section S205-9.

Note: Skylights are not designed to be walked on. See Code for requirements for skylights with low slopes.

S304-8 Classroom Proportions

a. Rooms shall be properly proportioned for intended use. In general, it is recommended that the short side of any room intended primarily for classroom or similar use be not less than two-thirds of the longer side. Since the windows are intended for view to the exterior, the maximum distance from the glazing to the most distant point within the room should be such as to permit view to the exterior by the room occupants. Forty feet is a suggested maximum. See also Part III Acoustic Environment requirements.

b. Ceiling Heights

1. The ceiling heights of classrooms and similar areas measured from the floor to the principal plane of the ceiling shall not be less than nine feet.

2. Ceiling height of other spaces shall be properly proportioned to the size of the room, and as required by special considerations, with 7'-6" minimum. Note that low ceilings are generally more susceptible to physical abuse.

S304-9 Interior Finish

a. Color and finish of walls, ceilings, floors, and even furnishings and equipment provide an important contribution to a pleasing and efficient visual environment.

b. Flat or mat-finish high reflectance surfaces not only provide better visual quality, but also improve the efficiency of the lighting system. Bright, glossy surface finishes reflect light sharply and are sources of undesirable glare. Such glossy surfaces should be avoided, particularly below eye level.

c. See Interior finish, S202.

S304-10 Security Lighting

a. Security systems such as exterior lighting should be incorporated into the design of school site and building.

PART IV

SITE AND UTILITIES

S401 GENERAL

a. The many essential educational and architectural factors in the selection of a site include the following:

1. Esthetics and suitability to the program including location, access, gentle contours in areas to be developed for play areas, separation from hazards such as rail roads, airports, rivers and lakes, and abrupt changes in elevation such as cliffs or ravines.

2. Environmental concerns including existence of an aquifer which may require special construction or even preclude construction of some necessary facilities, elevations above ground water table and flood levels, proximity to wetlands, historic sites, historic districts, and other sensitive areas.

3. Suitability for construction including soil conditions, costs as well as availability of the necessary utilities and services, freedom from disturbing noises, obnoxious odors, traffic hazards, ground contamination and proximity to local provisions for fire safety and other health and safety services.

b. Exposures to various facilities involving existing or proposed electric, gas and liquid fuel transmission, and distribution lines shall be limited within safe distances (See S409, S410, S411).

c. Sites should generally be selected where municipal water supplies are available or where conditions for well water are known to be favorable.

d. The availability of municipal sewer disposal systems is a distinct advantage in the selection of a school site. However, where municipal sewer districts do not exist, soil conditions and the availability to absorb sewage effluent are factors for consideration in site selection and operation.

e. Consideration of fire department facilities, available equipment and fire department reporting systems must be investigated.

f. Security systems such as exterior lighting should be incorporated into the design of school site and building. Police surveillance and available communication systems in an area may be desirable assets in the selection of a site and design of site access.

g. Site design must take into consideration separation of vehicular and pedestrian traffic for the health and safety of students. Strict requirements must be followed in the design of bus drop areas to eliminate vehicular traffic coming between the bus drop and the school building and bus movement during loading and unloading of students. Bus drop areas should be designed to eliminate the necessity to back up any bus.

h. Reference should be made to Facilities Planning publication, '"School Site Standards, Site Selection and Site Development", to determine the safety criteria and requirements that must be applied to the site and for the building during the planning and design phases.

S402 EFFICIENT UTILIZATION OF ENERGY AND SITE SELECTION

a. Site selection must anticipate the correlation of the future building with site features including natural topography, existing trees, and orientation to sun and prevailing winds. In the energy-wasting past buildings have often ignored their natural environment and have compensated for this oversight, by relying almost completely upon artificial lighting and mechanical means of heating and ventilation.

b. The orientation of the proposed building must consider the following:

1. Natural lighting can be utilized in a manner to minimize the continuous use of many of the artificial lighting circuits in a school, particularly those on the perimeter. Adequate control of such natural lighting is important, both as to the quality of daylight admitted, and the amount of solar heat to be admitted into the building, or shielded from it, dependent upon outside temperatures. The quality of natural light depends upon sun location, diffusion by trees, natural and artificial obstructions in the surrounding terrain, and whether such light is admitted directly through windows and skylights or reflected through such openings from the underside of overhangs or from reflective ground surfaces.

2. Solar heat gain into the building through glazed areas, as well as solar heat absorbed by the walls and roof of the structure which eventually radiates into the building interior, must be calculated to efficiently utilize such energy. Note that outside air intake into the ventilation system can be introduced in increasing quantities as the building overheats. Consider the possible future use of solar collectors, with proper orientation for collector mounting and space for storage.

3. Insulation, and reduced cold air infiltration from winter prevailing winds, is aided when windows are minimized on the northerly exposures and such walls are heavily insulated. Location of the building on the site may be such as to permit locating rooms not requiring daylight on the northerly exposures.

4. Natural ventilation of a building is affected by the air flow resulting from the prevailing wind path over the natural terrain and existing obstructions of the site. The exposure to air flow will affect the air infiltration through the building shell, during the heating season; however, maximum natural ventilation is desirable during spring and fall seasons.

5. Sound Isolation from exterior noise sources such as ground vehicular or airborne traffic, mechanical or electrical equipment and areas of public assembly must be considered when siting sound-critical spaces. Locating sound-critical spaces away from noisy outdoor areas will decrease the isolation requirements and costs for walls, roofs and windows.

S403 STANDARDS OF CONSTRUCTION AND CODES

a. New and enlarged sites and new and enlarged buildings must meet the requirements of the State Environmental Quality Review Act (SEQRA). The State Education Department is lead agency for public schools.

b. Generally the standards of construction for site and building are the New York State Uniform Fire Prevention and Building Code and those contained within this Manual and the Education Department's publication "School Site Standards, Site Selection and Site Development". Cooperation and coordination with other planning agencies, municipalities and counties should be planned in the selection of a site and in the determination of accessibility, entrances, and exits

onto roads and highways. Land fills and locations of unfavorable industrial and other environmental detrimental areas should be avoided. Existing trees and pleasant landscaping should be preserved to maintain the beauty and enhance the environment of the school and locality.

c. Local and municipal codes generally do not apply to schoolhouse construction or to the site. It is intended that cooperation and communication be maintained with municipalities and state agencies to coordinate various efforts of good design.

d. The requirements of the local public utility companies shall be applied to the site. The rules and regulations of the Public Service Commission with respect to gas, electrical, and petroleum transmission and distribution lines apply to the placement and installation of such lines near school buildings. Similarly, the placement of a school building near existing transmission and distribution lines must necessarily meet the same requirements of the Public Service Commission.

e. All underground pipes and conduits, regardless of their contents, shall be protected from corrosion and shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.

S404 WATER SUPPLY

a. No source of water shall be utilized without the approval of the State Health Department through their appropriate District Office or County or City Health Department. Connection for water supply source shall be made to existing lines of nearby water districts or municipal water systems wherever possible. Permits for water well drilling and connection to public water supply systems are required by 10 NYCRR 5 State Sanitary Code.

b. Water supplies for schools must be adequate, safe and palatable. There shall be an abundance of water available at all times for present and future expanded needs, at least 30 gallons per pupil per day for all purposes. The water must be safe for use as determined by state or local health authorities and must be maintained safe by protection of the source of supply by necessary treatment and by frequent analysis. For drinking purposes, water must be reasonably free of sulphur, magnesium, or similar natural minerals which render the vater unpalatable.

c. Piping and fittings used in water distribution systems must be non-toxic materials which will not affect the condition of the water as to health, odor, or taste. Lead content in solder is limited to 0.20 percent.

d. Standard fire hydrant facilities shall be installed where a municipal water supply is available at location(s) which will allow 500-foot length(s) of fire hose to come within effective quenching range of any fire around the perimeter of the building. Conversely, hydrants should not be located within 50 feet of the building for accessibility and for good utilization. Investigation of existing water pressures and possible coverage should be made with local municipal water district officials and fire department officials. To obtain better fire insurance rates from fire insurance rating organizations, a minimum water flow of 500 gallons per minute should be provided by the municipal water district. Actually, flows of higher capacities may be required for some buildings in order to provide adequate fire protection. A loop or grid system of water flow should be provided wherever the mains are available.

e. Prior to acquiring a site for a school building, boards of education and their architect or engineer should consult with the appropriate county, city, or state district health agency in a preliminary

review to determine if the prospective sites can provide adequate water facilities.

S405 SWIMMING POOLS

a. Installations of swimming pools as part of the physical education program require certificates of construction by the Department of Health. Therefore, it is necessary to submit applications for approval to the local agency of the Health Department early during the design stage in order to receive swimming pool approval prior to the submission of building construction plans and specifications to the Commissioner of Education for review and for approval.

b. See S704-3b, 10 NYCRR 6, and 9 NYCRR 650 Article 9.

S406 AIR EMISSIONS

a. Construction of new sources or modifying an existing source of air contamination is required to obtain a permit from the New York State Department of Environmental Conservation Division of Air Resources prior to construction and installation. This applies to combustion installations which exceed an output of one million BTU per hour. Permits are valid for up to one year from the date of issuance. (see 6 NYCRR 201 and 6 NYCRR 482)

S407 SEWAGE DISPOSAL

a. Municipal sewage disposal systems are preferred for interconnection of a school building. Privately owned sewage disposal systems have been approved and accepted for interconnection with the school building; however, the Department of Environmental Conservation and this Office want assurances of perpetual availability and service of such systems. Where the site is adaptable and suitable, drain tile fields, cesspools, sand filter beds, and packaged treatment plants are acceptable to the Department of Environmental Conservation and to this Office. Prior to the acquiring of a site for a school building, boards of education and their architect and engineer should consult the appropriate County, City, or State Environmental Conservation Agency, in a preliminary review to determine if the proposed sites are adaptable to provide adequate sanitary facilities.

b. Plans for school sewage disposal systems should be based upon reasonable future requirements as well as present needs. Sewage connections to existing or nearby sewer districts or municipal systems shall be made wherever possible. If no such system is available, an independent system must be designed, including septic tanks, filter beds, or leaching fields or cesspools. Plans and specifications for independent sewage disposal systems shall be presented to the office of the appropriate local agency of the Department of Environmental Conservation at least 60 days prior to the date of desired approval. Approval for final plans and specifications for sewage disposal must be obtained from the local agency of the Department of Environmental Conservation or their appropriate District Office. The services of the local public sanitary engineer should be sought in the early preparation of plans in order that the plans when completed will be acceptable to the Department of Environmental Conservation. Permits for on-site sewage system construction and operation are required. See 6 NYCRR 750.

c. Normally the design for school septic systems is based upon a minimum of 15 gallons per pupil of flow per day without showers and 20 gallons per pupil per day with showers.

d. Roof leaders must not be drained into independent school sewage disposal systems and must be conveyed independently to separate approved systems, ditches, streams, or other approved outlets. Investigations of availability of municipal storm systems must be made prior to design.

S408 STORM DRAINAGE AND ACCESSIBILITY FOR SCHOOL SITES

a. Effective storm drainage of the school site and building and proper entrances and exits of the school site shall be planned and indicated on the plans and specifications submitted to the Commissioner of Education for approval. The appropriate superintendent or commissioner of highways shall also be advised by letter of the location of all temporary and permanent entrances and exits upon a public highway and the storm drainage plan to be used.

S409 GAS TRANSMISSION AND DISTRIBUTION LINES AND EQUIPMENT

a. Placement of gas transmission and distribution lines within certain distances of school buildings is regulated by the Public Service Commission Codes, Rules and Regulations NYCRR Part 255 and by the Federal Department of Transportation, Part 192. Conversely, school buildings must not be located within certain distances of existing gas lines unless such gas lines have met the requirements of the Public Service Commission and Federal Department of Transportation for the placement of school buildings and the installation standards of the American National Standards Institute. (See Appendix B Accepted Standards.)

b. Outside shut-off valves to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.

c. Pressure regulating and over pressure protection devices located outside the school building shall be enclosed in a cabinet, gas house, cubicle, areaway, vault, pit or fenced outside areas of durable structural materials which will withstand any loads to which they may be subjected. When pressure regulating and over pressure protection devices are located in a separate room within the building walls, construction of this room shall be of two-hour fire resistant, masonry concrete construction throughout (walls and floor) and sealed to the concrete slab ceiling or roof construction. This area shall be accessible only through an outside opening, where practical, shall be well ventilated and shall have adequate space and protection from falling objects for both equipment and piping.

d. Gas service pressure regulators and over pressure relief valves shall also be suitably vented into the outside atmosphere at sufficient height to prevent hazardous conditions to children and the surrounding area.

e. See S710, Part VII, Plumbing and Gas Facilities.

S410 ELECTRICAL TRANSMISSION AND DISTRIBUTION

a. Electrical lines must not extend overhead across any useable portion of the site or where they would present a hazard to the children. They should follow property lines; however, distribution service lines may extend along driveways onto the site. It is preferred that service lines be installed underground wherever possible.

b. It is recommended that an approach be taken which minimizes unnecessary increases in existing levels of electromagnetic field exposures.

c. Interim measures, applicable only to future electric transmission facilities certified under Article VII of the Public Service Law are:

1. Transmission circuits shall be designed, constructed and operated such that magnetic fields at the edges of their tights-of-way (measured one meter above ground level) will not

exceed 200 milligauss.

2. Where there is no edge of the right-of-way define the field level shall not exceed 200 milligauss above at a horizontal distance of 75 feet from the centerline of a transmission circuit operating at 345 KV, or 60 feet from the centerline of a circuit operating at 230 KV or 50 feet from the centerline of a circuit operating at a lower voltage.

3. Where multiple transmission circuits will exist within the same corridor, the combination of circuits shall be used to determine compliance with the interim 200 milligauss standard.

4. An electrical field strength interim standard shall be 1.6 KV/m for facilities (at the edge of the right-of-way) one meter above the ground level, with the line at rated voltage.

S411 LIQUID PETROLEUM TRANSMISSION AND DISTRIBUTION

a. It is most desirable not to have liquid petroleum pipelines on school owned property; however, pipelines may extend along property lines if the building can be located sufficiently distant to prevent hazardous conditions. Piping must be placed away from traffic patterns of vehicles or else must be adequately protected by casements or other structural methods. These pipelines as constructed for the operating pipeline companies must meet the requirements of the American National Standards Institute (ANSI B30.4). Forthcoming rules and regulations of the New York State Public Service Commission must be applied in the placement, location, construction, operating conditions, maintenance program, and other limitations.

PART V

MECHANICAL AND ELECTRICAL PLANNING

S501 GENERAL

a. General Provisions, Section S1 through S14 also apply to this Part.

b. A school building must provide for the health, comfort, and safety of children, teachers, and other occupants. No mechanical equipment or construction materials shall be used, nor any type of construction permitted, which will endanger the health, safety, or comfort of all occupants in the school building.

c. It is strongly recommended that the school board authorize engineering studies of any new building program by an engineer, in conjunction with the architect, to determine all practical steps that can be taken in the building design to most efficiently utilize the energy that will be consumed. Selection of equipment, and method of its use, should be made on a basis of Life - Cycle Costing. Heat recovery systems should be utilized wherever possible. Discretion must be used in the selection of any mechanical system; the efficient utilization of energy in one particular system may have complementary, or contradictory, effects on other systems of the same building, and, therefore, require alternative selections.

d. Schools submitting building plans and specifications to the State Education Department for Commissioner's approval shall not place air intake vents adjacent to school bus loading/unloading areas, loading docks, or air exhaust vents.

S501-1 Computer Technology

New Construction and Additions

a. All new work should be designed to accommodate future expansion of existing computer and technology networks.

Reconstruction

a. Whenever reconstruction work involves opening existing walls careful thought should be given to installing conduits and or wiring and cables for computer local area and wide area networks.

S502 AVAILABLE SERVICE

a. At the outset of a building program an investigation must be made with regard to the available fuels, electrical service, water supply, and sewage disposal facilities which are available or for which provision will have to be made.

b. The selection of the energy for heating and of heating mediums and systems must be made with economic considerations for owning and operation of the systems, as well as for their relative efficient use of energy.

S503 PROTECTION OF PIPING

a. At the section of entry into a school building, all underground pipes and conduits, regardless of

their purpose, shall be protected against corrosion, shall be provided with sleeves, and shall be sealed with a material which will form a gasproof barrier.

S504 EQUIPMENT IDENTIFICATION

a. All heating, ventilating, air conditioning, and electrical equipment and their controllers shall be labeled and tagged for quick identification.

b. All piping and valves shall also be marked and identified as to direction of flows and type of flows within piping in accordance with ANSI 13.1. (See Appendix B, Accepted Standards).

S505 COMMISSIONING THE BUILDING

a. The mechanical and electrical specifications shall require that trade contractors or their representatives shall instruct the Board of Education or their representatives in the proper operation and service of all mechanical and electrical equipment at the time of completion and before acceptance of the school building.

b. An operation Manual shall be provided by the Mechanical and Electrical Engineers. This manual shall explain in general the type of mechanical and electrical systems that have been provided; the function of heating, ventilating, and air conditioning systems, the intent of the temperature control systems, operation of boilers or furnaces; the provisions of the electrical systems with regard to the functions of the fire alarm and detection system, exit light system, emergency lighting and the distribution systems for lighting, power, and communications; and the necessary preventive maintenance for electrical equipment and fans, air handling systems and individual items of heating and equipment which will be necessary to maintain the building.

c. Provision shall be made for initial start-up and operation of the mechanical and electrical systems by the contractor(s) in the presence of the architect or engineer, the owner's representative, with the assistance of the necessary factory trained mechanics, and public utility representatives as required for the various systems.

d. Consideration should be given to videotaping all start-up procedures and instructions for future reference and staff training.

S506 YEARLY INSPECTION

a. Boards of Education shall make provision for at least yearly inspection of all mechanical, electrical, and automatic equipment and flame safeguard controls for burners and boilers by competent personnel or by control service contracts to make sure that the systems operate properly and efficiently.

S507 STANDARDS

a. All mechanical and electrical devices and equipment and packaged equipment shall meet the standards and bear the label of recognized testing agencies, such as the Underwriters Laboratories. As minimum standards, the boiler burner installations shall meet the minimum requirements of the Underwriters Laboratory; or the more stringent standards of the Factory Insurance Association or Factory Mutual Association should be considered.

b. Generally, all mechanical and electrical installations shall meet the requirements of the American National Standards Institute (ANSI) and National Fire Protection Association (NFPA).

c. All major items of kitchen equipment shall be selected for sanitary operation and maintenance and shall bear the seal of National Sanitation Foundation (NSF). In addition, the energy efficiency of appliances shall be a prime consideration in their selection.

d. Fire dampers shall be provided and installed in fire walls and enclosures and between floor levels in accordance with NFPA-90A. Fire wall construction is provided generally in boiler rooms, heater rooms, kitchen exhaust hoods, roof-top mounted units, and between floor levels. Openings in fire resistive ventilation shafts and stairwells must also be provided with fire dampers. All fire dampers shall be shown on the plans. Smoke detectors may be used in the return plenum of roof-top mounted units in lieu of fire dampers.

e. Smoke dampers shall be provided in smoke partitions which may be required to extend to the roof deck or to the ceiling slab.

S508 MECHANICAL REQUIREMENTS OF SPECIAL AREAS

a. In the early stages of design, a study should be made of the educational program to determine special mechanical and electrical requirements in various areas, such as the large group instruction, auditorium-study halls, audiovisual, vocational, music, science, homemaking center, and art center classrooms, and in the cafeteria, kitchen, and equipment drying room. In these areas special ventilation or air exhausting, special temperature controls, special temperature zoning, special plumbing fixtures, special gas and air piping, special power provisions, special acoustical requirements, and special lighting needs may be required to achieve a satisfactory design.

b. Special attention must be given to such factors as electrical "demand" loads (as created by welding shops and swimming pool heaters) to achieve an energy efficient building package.

S509 AS BUILT DRAWINGS AND VALVE IDENTIFICATION

a. Mechanical "as built" drawings shall be provided to the owner for heating, ventilating, and air conditioning diagrams, plumbing diagrams, electrical diagrams for power and light, fire alarm systems, exit light systems, emergency light systems and other when installations differ from the engineer's original drawings.

b. "As built" drawings shall be provided to the owner on burner primary controls, boiler controls, temperature and pressure controls, piping, power wiring, and all equipment in boiler room.

S510 BALANCING OF MECHANICAL AND ELECTRICAL SYSTEMS

a. Responsibility for balancing of mechanical and electrical systems should be clarified within the specifications. Either the mechanical or electrical contractor, a separate balancing contractor, or the design engineer, if qualified, should be specified as the responsible party who shall balance the mechanical and electrical systems to perform and function within the design criteria.

S511 MACHINERY GUARDS

a. Adequate guards shall be provided on all moving parts of mechanical and electrical equipment such as belts, pulleys, couplings which may be a safety hazard.

S512 NOISE LEVELS

a. Mechanical and electrical equipment shall be selected so that there is no noise interference with communication or intended use in any place of pupil occupancy. Noise levels in all other areas shall be maintained at acceptable levels with consideration given to the intended use of such space. See also Part III Acoustic Environment requirements.

PART VI

HEATING, VENTILATING, AND AIR-CONDITIONING REQUIREMENTS

S601 PERFORMANCE STANDARDS

a. General Provisions Section 1 through S15 also apply to this Part.

b. These standards are performance standards. The Commissioner of Education has been given wide, discretionary powers in the approval of specifications for heating and ventilating and air-conditioning. Any type of system which meets these minimum standards will be considered for approval. However, simplicity of design with detailed attention to the efficient use of energy, and ease of maintenance, shall be considered which will provide an effective system at economical cost. Consider the possibility of adding solar heat collectors in the future.

S602 HEATING

S602-1 General

a. All heating and cooling generating equipment, accessories, and controls and their installation shall be tested to insure safe operation and shall bear the seal of approval of a national testing agency as the Underwriters Laboratory for minimum standards of construction and installation; all pressure vessels shall bear the seal of the ASME Boiler and Pressure Vessel Codes.

S602-2 Boilers and Boiler Pressures

a. Only low pressure boilers shall be installed in school buildings. Such boilers shall produce steam or vapor at a pressure of 15 pounds per square inch gauge (psig) or less, or hot water at a pressure not exceeding 160 pounds per square inch gauge (psig), and at a temperature not exceeding 250 degrees Fahrenheit.

b. High pressure boilers may be installed in a centralized heating plant. The centralized heating plant shall be a separate facility and shall not be part of a school building. Heat exchangers shall then be installed in the school building to provide a low pressure distribution system throughout the building.

c. Boilers which are used for vocational instructional purposes shall meet all the equipment and control requirements as for conventional heating equipment used in boiler rooms. High pressure boilers as used in dry-cleaning processes shall be installed in separate rooms, as is required for conventional heating equipment.

S602-3 Fuel Burning Equipment

a. Fuel burning equipment in boilers, furnaces, and domestic hot water heaters having an input over 400,000 BTU per hour per combustion chamber shall be listed and bear the seal of approval of a national testing agency such as the Underwriters Laboratories Inc. or American Gas Association Laboratories. This requirement for U.L. or A.G.A. listing shall also apply to all controls and accessories that are necessary to insure safe operation. Fuel burning equipment shall also meet the minimum inspection requirements of Codes, Rules and Regulations of the State of New York, NYCRR, Code Rule 4 and Code Rule 14 where applicable. Further, the intent is to encourage the incorporation of new devices and controls, as they are developed and

accepted, into the control system of the boiler-burner and heating system. Where applicable, to a particular heating system, the fuel burning equipment shall include the following:

1. Automatic electronic flame safeguard controls shall automatically de-energize the electrical circuit to the main fuel valves within 4 seconds upon flame failure. The de-energized valve shall automatically close within the next 5 seconds. (See S602-3c.8).

2. The trial for ignition period for the pilot on automatically fired boilers and furnaces shall not exceed 15 seconds. Also, the trial for ignition of the main burner shall not exceed 15 seconds.

3. The burner and boiler shall be installed with adequate controls to provide the following functions and interlocks as may be necessary on the individual design:

   a. Air flow supervision to the combustion chamber.

   b. Pre-ignition purging of the combustion chamber.

   c. Proven start and supervision of induced draft and forced draft fan operation.

   d. Proven low-fire start on inputs over 1,000,000 BTU per hour.

   e. Shut-down on low oil temperature and low oil pressure.

   f. Non-recycling safety shut-down or upper limit gas pressure or low limit gas pressure.

   g. Proving fuel valve in closed position for burners on boilers over 250 BHP.

   h. All flame supervisory and programming control units should include a self checking circuit. This self-checking must be performed at least once on each ignition cycle. It would be preferred if the flame detector and programmer checked itself continuously and periodically during operation to assure safe equipment conditions during prolonged firing periods.

   i. High limit manual reset operating control of heating medium. This additional limit control shall not be installed on a common sampling tube with the operative limit control.

   j. High pressure limit control for steam; high temperature limit control for warm air and hot water.

   k. Low water cut-off control and low water feeders and auxiliary low water cutoff with manual reset. Low water cut-off may be of the float type. The auxiliary low water cut-off manual reset may be of the probe type.

   l. Necessary operational controls for safe operation of boilers.

   m. An alarm system to signal burner failure and shut-down in response to item h, this section.

   n. Air supply for combustion:

i. Sufficient fresh air shall be provided in accordance with New York State Uniform Fire Prevention and Building Code to the heat generating apparatus to allow complete combustion of fuel at all firing rates.

ii. For gas or oil power burners the boiler room shall have at least one square foot of free opening area for the entry of fresh air for every 2,000,000 BTU of fuel burned per hour. For gas equipment with draft hoods, the boiler room shall have at least one square foot of free opening area for every 720,000 BTU of fuel burned per hour.

iii. The opening for fresh air combustion should terminate in the boiler room near the floor level. It should be kept free and clear at all times.

iv. In addition to air required for combustion, sufficient air shall be supplied for ventilation; including all air required for comfort and proper working conditions for personnel. The opening shall be covered with 1/4 inch mesh screen and terminate in the boiler room near the floor level.

o. Observation ports shall be provided for visually observing the pilot and main flame.

p. Testing and initial check-out of the burner, boiler, and related fuel burning equipment controls shall be performed by the manufacturer's representatives.

q. New boilers shall have provision for burning dual-fuel unless otherwise approved by the Commissioner.

b. Fuel burning equipment in boilers, furnaces,and domestic hot water heaters having an input under 400,000 BTU per hour per combustion controls shall bear the approval of a national testing agency such as the Underwriters Laboratories, Inc., (U.L.) or the American Gas Association Laboratories (AGA), for the entire package of boilers, furnaces, domestic hot water heaters and their fuel burning equipment and safety controls.

c. The following general boiler room provisions must be provided:

1. Gas piping, including the boiler or furnace gas train, shall be in accord with the rules and regulations of the public utility and in accordance with the appropriate ANSI Codes (Z21.33, Z21.30, Z83.1, Z95.1).

2. A manual fuel shut-off valve on the supply main which is accessible for emergency use.

3. ASME approved safety relief valves of adequate capacity and size for the pressure vessel.

4. Operational tests for all fuel and distribution piping and start-up tests for burners and boilers and furnaces and boiler room equipment. (See S505c.)

5. Adequate space and arrangements for removal and replacement of boiler tubes.

6. Owners representative to be provided with a set of instructions of operation of the boilers and burners. A complete list of equipment and motors in the boiler room with catalog numbers and instructions for maintenance must be provided. (See S505a)

7. Emergency break glass station at boiler room entrance or entrances (inside or outside of

boiler room) to de-energize the primary control circuit and to close the main fuel valves and shut down the fuel pumps to stop the flow of fuel through the burner during an emergency.

8. The electrical supply to the control system shall be 120 volts AC with one line grounded. High voltage and low voltage wires shall be run in separate conduit. Conductors for flame sensor or detectors for safety controls shall also be run in separate conduit. Conductors shall be color coded as follows:

   black - hot
   white - neutral
   green - ground

9. Mechanical exhaust and atmospheric type flues shall be in accordance with ANSI Z21.30.

d. The following general boiler room provisions should be provided:

1. Propane detector(s) are strongly recommended and should be considered in buildings which have propane service. Propane is heavier than air and will settle into depressions or lower floor levels. Detectors should be located in such areas.

2. Natural gas detector(s) are recommended where ever natural gas is used.

3. Carbon monoxide detector(s) are strongly recommended in all areas where fuel burning devices are located.

4. A flood detection system is recommended for areas which have the ability to hold water, such as boiler rooms.

S603 INDIRECT FIRED HEATING UNITS

a. Indirect fired heating units with heat exchangers, such as self-contained heaters or heating and ventilating furnaces, regardless of fuel used, shall not be installed in any place of pupil occupancy. All indirect fired heaters shall be located within fire resistive spaces having at least two-hour fire-rated construction, and such spaces must have fire dampers at wall penetrations.

b. Roof-mounted indirect fired units with open type electrical heating elements and furnace combustion areas may be used when installed in accord with the following criteria.

1. The structural integrity of the roof deck must be maintained within the curb(s) supporting the unit by fire resistive material - something other than the integral bottom of the unit, i.e., metal roof deck, metal pan, structural slab, etc.

2. A ceiling of non-combustible material must be installed in areas below the unit and below duct work from the unit, or a noncombustible enclosure below the unit and duct work with fire dampers at all penetrations, or noncombustible 2 hour rated roof system with fire dampers at roof penetrations.

3. Automatic smoke detection must be installed in the return air duct(s) to the unit, interconnected with the unit and fire alarm system so that detection of smoke will shut off the main supply of fuel or energy and sound the building fire alarm system. (See S807-3.)

c. Electric Heating Requirements. (See S802.)

d. Direct fired heating units are not allowed to supply any student occupied spaces.

S604 BOILER ROOM VENTILATION AND COMBUSTION AIR

a. Heater and boiler rooms shall be provided with permanent louvered openings, or with motor operated dampers interconnected with the burner operation, to insure an adequate supply of combustion air. Gravity ventilation should be provided as necessary to reduce heat build-up in the space. Forced ventilation for heater and boiler rooms is required if the space above the room is occupied. Wherever spaces exist above the boiler room, then the ceiling must be made fire-resistive, providing at least a 2 hour rating and shall be insulated to prevent heat transfer. Caution should be used so as not to cause the Boiler Room to operate at a negative air pressure, which can cause hazardous and explosive reactions. (See S602-3a3.)

b. Air handling units located in boiler rooms shall be furnished with seals and locks on access doors to prevent natural gases, fumes, and exhaust gases from being drawn into the units and distributed throughout the building. Such units should be located in mechanical equipment rooms other than boiler rooms.

c. Duct work passing through, and openings in interior walls, floors,and ceilings of boiler rooms shall be provided with at least 1 1/2 hour rated fire dampers. (See S507-d.)

S605 TEMPERATURE CONTROLS

a. A temperature control system that is best suited to provide the desired thermal environment shall be provided for the intended use.

b. Temperature Control Panels should be located so as to be under the supervision of the building supervisor, either in the custodian's office, mechanical equipment room, or in a central area. Such panels should not be located in the Boiler Room.

c. Control systems shall be arranged and cycled to provide the conditions described for heating, ventilation and/or mechanical cooling as described in S606. Advantage should be taken of natural "free" cooling whenever outdoor temperatures will allow provision for favorable indoor conditions. Occupied-unoccupied setbacks shall also be provided to allow for more economic operation of the building and for the most efficient utilization of energy.

d. For proper performance and economy, systems for heating, ventilating, and air-conditioning are sufficiently complicated to require automatic controls. Maintenance programs or service contracts are essential to cause these to function and operate so as to result in a satisfactory thermal environment.

S606 THERMAL ENVIRONMENT

S606-1 General

a. Architects, engineers, boards of education and educators must have common understanding, at the outset of a building program, of the design criteria selected, and of the thermal environment that can be attained from such criteria. The efficient use of energy for the operation of the heating, ventilating, and mechanical cooling systems may mean that at certain infrequent outside temperatures the interior thermal environment may be other than optimum. See S606-2d and

S606-5e.

b. Schools are occupied during the warmer hours of the day, and, due to the metabolic heat released by occupants, the heat of lighting, office equipment, computers, and solar gain, there is a build-up of heat. It has been demonstrated that schools normally require cooling most of the day, even when outside temperatures are below freezing. This condition is even more prevalent in interior spaces.

c. Infiltration, sometimes greater than 0.5 air changes per hour, occurs naturally through windows, doors and other areas of air leakage of a building which are not under positive pressure. To this must be added the purges brought about by exterior doors being opened for passage of the entire school population at least twice daily, plus unavoidable air leakage through ventilation equipment.

d. Energy is more efficiently used in heating, ventilating, and mechanical cooling systems when outside air introduced by such systems does not have to be heated. Also, when inside temperatures rise, it is desirable to introduce increasing quantities of out side air to provide natural cooling without the use of mechanical cooling equipment. Auxiliary forms of ventilation such as operable windows, louver intakes, and supplemental mechanical exhaust must be considered in addition to ventilation supplied from basic units.

e. Select heating, ventilating, and cooling equipment as close as practicable to calculated loads.

f. It is strongly recommended that heat recovery devices be provided for all significant exhaust air systems.

g. Fiberglass ducts shall bear the Class 1 U.L. label and be used according to NFPA 90A.

h. Motors operating fans in central and multizone air handling systems and exhaust systems, having fan capacities of greater than 1000 cfm, (see 807-1) shall be interconnected to the fire alarm system to shut down such motors when the fire alarm is activated. It is recommended that single unit ventilators serving individual rooms, and exhaust fans of 1000 cfm capacity and less, also be so connected.

S606-2 Heating

a. Heating and ventilating systems shall be so designed that when properly installed and operated during the heating season they will produce the room temperature, scheduled in Table S606-2. Systems shall include automatic night setback control cycles.

b. Maximum air temperature gradient from floor to 60" above floor shall not exceed 5°.

c. Air motion in zones of occupancy shall not cause discomfort of occupants, due to hot or cold air movements. Air shall be introduced in such manner to prevent pockets of stagnant air.

d. Heat losses may be calculated on outside winter conditions in the 97 1/2% column of Guide Tables on Weather Data and Design Conditions, ASHRAE Handbook of Fundamentals. (See S606-la.)

TABLE S606-2
Recommended Minimum Room Temperatures *
(degrees F. dry bulb)

Boards of Education must establish minimum allowable temperature for occupancy. It is recommended that a resolution be on the books which will set the standard for a minimum and maximum temperature at which the district will allow occupancy.

Type of Space	Temperature Range	State Code design ** temperature
Sedentary activities		
Classrooms, Auditoriums, Offices		
Cafeterias	66° - 70°	65°
Moderate activities		
Shops, Laboratories, Kitchens	66° - 68°	65°
Vigorous activities		
Gymnasiums, Playrooms	64° - 66°	60°
Locker Rooms	70° - 72°	75°
Shower Rooms	74° - 76°	75°
Swimming Pool Area	78° - 80°	75°

* Consistent with efficient utilization of energy resources, these ranges of temperature account for varying types of activity and appropriate dress. The upper range is more applicable to elementary; the lower to secondary.

** State Code as of 1/1/1996 from Table I-1000 for "Buildings intended for occupancy between the 15th day of September and the 31st day of May of the following year shall be provided with heating equipment designed to achieve the minimum indoor design temperatures in table I-1000 at a distance of two feet and more from exterior walls, and at a level of five feet above the floor.." The Education Department recommends that consideration be given to floor level temperatures for Kindergarten and younger occupancies and that a lower monitoring level be considered for seated activities.

S606-3 Ventilating

a. All occupied areas within school buildings shall be provided with mechanical ventilation of at least 15 cfm per occupant of outside air during periods of occupancy. During ventilation and cooling cycle, supply, return, and exhaust air handling equipment shall provide for variable introduction of outdoor air from 0% to 100% fan capacity, with proportionate increases of exhaust air and decreases in return air. Systems requiring quantities of cold air to be heated to an acceptable discharge temperature during a cooling cycle shall be avoided.

b. Interior spaces of pupil occupancy which are approved because of educational program shall be provided with equipment for mechanical cooling when natural cooling provided by outdoor air cannot maintain a temperature of 74°F.in the spaces. See S606-5g.

c. Classrooms may not be vented into corridors. Ceiling spaces over corridors may serve as plenums for exhausting classrooms however, when such spaces are used as plenums, the plenum must be of fire-resistive construction and be fire rated to maintain the required fire rating

separation of the corridor from fire in the space above and to either side.

d. Air intakes shall not be located adjacent to school bus loading/unloading areas, loading docks, or air exhaust vents.

e. School districts shall operate and, where necessary, upgrade the operation of heating, ventilation and air-conditioning systems to meet the ventilation standards of the American Society for Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), where needed and feasible.

S606-4 Special Ventilation

a. Special ventilating equipment, entirely independent of the ventilating system(s) serving the balance of the building, shall be provided in areas where odors are likely to be strong, where fumes or dust are common, where overheating is likely to occur, and as necessary to avoid concentrations of toxic fumes. Provide separate make-up air systems to all fume hoods wherever practicable, preferably using air recirculated from other portions of the building; however, if make-up air must be taken from the outside, temper such air sufficiently to avoid condensation in hoods. Consider heat recovery devices.

b. Recommended minimum ventilation quantities for special areas are:

1. Locker and shower rooms . . . . . 1 cfm per square foot floor area
2. Toilets . . . . . 2 cfm per square foot floor area
3. Kitchen - dishwashing
   - 3 sided hood . . . . . 100 cfm per square foot area
   - 4 sided hood . . . . . 150 cfm per square foot area

c. Cafeteria-Kitchens

1. Hoods with mechanical exhaust shall be installed over steam kettles, dishwashers, ranges, deep fat fryers, and other heavy-duty appliances.

2. Removable grease filters shall be provided in kitchen ductwork with adequate clearance from ends of flues or appliance vent to grease filter. Provision for inspection and cleaning must be provided.

3. Two hour fire resistive chases must be provided for ducts from main kitchen exhaust hoods which extend horizontally through other spaces or which extend vertically through floors.

4. Automatic extinguishing systems where required in hoods and ducts must be interconnected to the building fire alarm and must shut off the main fuel or energy to kitchen equipment.

5. Kitchen supply ventilation may be taken from cafeteria exhaust when the kitchen is under negative pressure; however, consideration must be given to the reduction of the transmission of noise between rooms.

d. Locker room ventilation may be supplied from gymnasium exhaust which in turn can supply shower room ventilation.

e. Shops, laboratories, science and homemaking rooms shall each have separate ventilation systems.

Local mechanical ventilation with hood vents shall be provided at benches for electric welding and also at spray paint stations in shops.

f. Internal combustion engines of vehicles and emergency generators shall be exhausted directly to the outdoors. Exhaust pipes shall not be terminated in shafts. Carbon monoxide exhaust systems are required in shops where three or more vehicles will be repaired, serviced or operated.

g. Boiler Rooms. (See S602-3a-3n and S604).

h. Toilets. (See S707-6).

S606-5 Mechanical Cooling (Air-Conditioning)

a. During the normal school year there are many days when mechanical cooling provided by refrigeration equipment would be desirable, and to an even greater extent, when there is extensive summer use of rooms.

b. Heating, ventilating, refrigerating and air-conditioning installations shall meet requirements and recommendations of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), as modified by these requirements.

c. Refrigeration and air-conditioning piping and installations shall meet the requirements and recommendations of the ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration. Relief valves for refrigeration equipment located in the school building must be vented to the outside. Outdoor condensing units must also be provided with relief valves.

d. Condensing units for refrigeration and air-conditioning equipment shall be located where adequate ventilation will be available for the satisfactory operation of such equipment. Such units shall not be located in storage areas which have minimal or no ventilation.

e. Heat gain may be based on summer conditions in the 2 1/2% column of Guide Tables on Weather Data and Design Conditions, ASHRAE Handbook of Fundamentals, designed to produce a maximum of 78°F. dry bulb room temperatures. See S606-1a.

f. Mechanical cooling shall be based on 15 cfm minimum outside air per occupant. For efficient use of energy, reheat systems, whereby quantities of cold air must be heated to an acceptable discharge temperature after having been previously cooled by the use of refrigerant equipment, shall be avoided.

g. Mechanical Cooling of Interior Spaces

1. Interior spaces of pupil occupancy, which are approved because of educational program, shall be provided with equipment for mechanical cooling in accordance with the above criteria, except that during the heating season of the normal school year such mechanical cooling shall maintain a maximum temperature of 74°F. in such interior spaces when this temperature cannot be produced by natural cooling. See S606-3b.

PART VII

PLUMBING AND GAS FACILITIES

S701 DESIGN CRITERIA

a. Plumbing facilities shall be provided for the intended use of the building per the requirements of Code, Commissioner's Regulation 155, and as noted in this Manual.

S701-1 Construction Code

a. Where specific requirements as deemed necessary by the Commissioner are not defined in this manual, these requirements shall be in substantial compliance with the provisions of the latest edition of the New York State Uniform Fire Prevention and Building Code.

S702 GENERAL

a. Complete, well-arranged, and well-maintained sanitary facilities are essential for health, comfort and convenience of the school child. The condition and sufficiency of these facilities affect the health and habits of the pupils.

b. Select equipment and design its operation so as to use energy efficiently.

c. Starting with the preliminary design stage, consideration shall be given to the needs of the physically impaired persons who may be using the building.

S703 SITE

a. See Part IV, Site and Utilities.

S704 WATER SUPPLY

a. See Section S404; Part IV, Site and Utilities.

S704-1 Water Softening

a. Generally, it is desirable to provide softened water at least for the domestic hot water line serving the kitchen, boiler, and other hot water outlets. Also, conditioned water should be provided for the cold water lines serving the kitchen and boiler room. Care shall be taken to insure that there is no recirculation and mixing of conditioned water and raw water in the distribution systems to prevent corrosion and restrictions in the pipe distribution lines. Check valves at strategic locations may have to be included.

b. Water softening processes should be considered early in order to incorporate such equipment, where possible, into the final building plans and specifications. Inclusion of such equipment in the final plans is possible if the school is to be served by an available municipal or water district.

c. Where well water is to be the source of water supply, it is many times difficult to predict the water condition and to select the water softening process equipment. Water softening should then be considered for incorporation into the building project by means of a 'change order'. In such instances, piping arrangements and valves shall be incorporated in the plans and specifications to accommodate the addition of equipment at a later date.

d. Separate and special valved connections and piping arrangements shall also be provided for boiler water treatment as deemed necessary.

S704-2 Fire Hydrants

a. See Section 404c, Part IV, Site and Utilities.

S704-3 Swimming Pools

a. See S405a, Part IV, Site and Utilities.

b. Mechanical equipment plans and layouts for swimming pools, together with their specifications, shall be presented to the appropriate State Health Department Agency at least 60 days prior to the date of the approval desired from the Office of Facilities Planning. Final plans and specifications for school buildings which include swimming pools shall not receive the approval of the Commissioner of Education until approval is granted bay the State Department of Health. PVC piping is not approvable, flame retardant CPVC is acceptable for this application.

S705 SEWAGE DISPOSAL

a. See S407, Part IV, Site and Utilities.

b. Grease traps and oil interceptors should be provided in kitchens and bus garage branches. If septic tanks are used, the acid-proof drain from the science laboratories should run into a separate "dry well". Art classrooms may also require clay traps and grease traps in the waste system, depending upon the extent of the instruction program.

c. Acid waste plastic drain piping, when used, shall conform to the requirements of Table 205-3. Flame retardant polypropylene is acceptable for this application.

S705-1 Roof Leaders

a. See Section S407d, Part IV, Site and Utilities.

b. Roof leaders must be conducted to the exterior of the building and off-site to existing municipal systems when available.

S706 PLUMBING

S706-1 Toilet Rooms

a. Toilet rooms for pupils of both sexes shall be located on each floor to provide greater convenience. It is not necessary to separate by great distances the toilet rooms for boys and girls, but their entrances should be screened. Toilet partitions are not required but should be provided where vandalism is not a problem. Hardware must be provided which allows toilet rooms to be open at all times of building occupancy.

b. Toilet rooms for kindergarten and primary rooms should, if possible, be placed adjacent to these rooms, and open into them. For other elementary, junior high school, and senior high school pupils, the toilet rooms should be located in the elementary, junior high, or senior high school areas, respectively.

c. Toilets for public use should be conveniently available to the auditorium, gymnasium, and other parts of the school plant commonly used by the public. Fixture count for these toilets must be equal for men and women's rooms per State Code, i.e. woman's water closet totals must equal the total of men's water closets and urinals. School toilets, if conveniently located, will sometimes serve this purpose. Toilets for public use as well as for team use should be provided convenient to the athletic field.

d. Special toilet rooms should be provided for school administrators, teachers, and service workers.

e. Hose bibbs and floor drains should be provided in every toilet room, with the floor pitching toward the drain.

f. Where school grounds are likely to be used on weekends, vacations, and other times when the school building, itself, is closed, it is advisable to provide toilet rooms for both sexes accessible to the outdoor physical education spaces without making it necessary to open up portions of the school building. This can often be done by planning the toilet facilities for the locker and shower rooms for exterior access, and then by providing a means for closing off these spaces from the locker and shower rooms.

g. Toilet Facilities in detached Classroom Buildings:

1. Classroom buildings which contain 3 or more classrooms are required to contain toilet fixtures in such quantity as required above and by section 900.2(h) of the State Code,
2. classroom buildings which contain 1 or 2 classrooms may use the toilet facilities located in the existing school building if all of the following conditions are met:
   i) the classroom building is in close proximity to the existing school building,
   ii) the path of travel from the classroom to the existing toilet facilities is on an accessible route and is within the usual maximum distance of 250 feet,
   iii) the classrooms do not house elementary grade students,
   iv) the existing toilet facilities are handicapped accessible, and in accordance with section 900.2(h) of the State Code, are of sufficient quantity to serve the increased student capacity, and
   v) potable water for drinking is provided in all classroom buildings.

S706-2 Size

a. Toilet rooms for general use should have a minimum width of 9 feet to allow for economical placing of fixtures. An additional access space of 30 inches back of the principal fixtures is desirable for pipes and service.

b. All individual student toilet areas (one in each gang toilet room) must be sized so that with facilities for people with disabilities can be installed if needed.

S706-3 Materials

a. Floors should be of ceramic tile or similar impervious masonry surfaces. Finished concrete floors in toilet rooms are not recommended.

b. Walls shall be of an impervious material, such as glazed tile, or vitreous cement enamel.

c. Stall partitions shall be of impervious material, such as baked enamel finish on metal, securely anchored. In girls' toilet rooms, compartments should be provided with doors having

substantial, non-corroding hardware and rubber bumpers. In boys' toilet rooms, compartment doors are optional.

S706-4 Accessories

a. No toilet room is complete without soap dispensers, grab bars, toilet paper holders, waste containers, mirrors, shelves and hand drying facilities. Sanitary napkin dispensers and waste receptacles are essential in appropriate toilet rooms.

S706-5 Water Closets, Urinals (Also See Appendix J - Accessibility)

a. Water closets should be of vitreous china and the extended-lip or elongated type and should be equipped with impervious, open-front seats. The wall-hung type of water closet greatly facilitates the cleaning of toilet rooms. Individual flush valves are recommended where there is sufficient water pressure. Water closets must be approved for commercial use by the New York State Department of Environmental Conservation and have a maximum 1.6 gallon per flush rating for flushometer valve or flushometer tank water closets.

b. Urinals should be designed to retain a deep water seal in the bowl as in the pedestal and wall-hung types. They should be so installed as to minimize sharp angles and to facilitate cleaning. Individual flush valves for flushing are recommended. Urinals must have a maximum 1.0 gallon per flush rating.

c. The following ratio of fixtures to pupils shall be considered minimum, provided that no less than two fixtures be installed in each room. These ratios are for the elementary and secondary school levels. Primary grade pupils who are served by individual toilets need not be recalculated to determine these ratios.

Table S706-5

	Water Closets	Urinals
Girls (elementary)	1:35	
Boys (elementary)	1:100	1:30
Girls (secondary)	1:45	
Boys (secondary)	1:100	1:30

d. Additional facilities for special areas should be provided in excess of those determined by these ratios.

S706-6 Lavatories

a. Lavatories or wash basins shall be provided for toilet rooms in the ratio of one fixture to 50 pupils, and shall be placed so that the pupils will pass them as they leave the room. Heights should be a minimum of 25 inches from the floor for elementary grades and a minimum of 30 inches for high schools. Study should also be given to the use of group washing facilities near the entrance of the cafeteria.

b. Lavatories may be without a stopper. Both hot and cold water should be provided from single stem mixing type faucets with spray nozzles. Positive temperature control should insure that the hot water will not exceed 100°F.

c. Lavatories may be located in an alcove immediately off the corridors and need not be located within the toilet rooms.

d. Lavatories must use self closing faucets with a maximum .5 gallon per min. flow at 60 psig or metering at .25 gallons per cycle.

S706-7 Shower Heads

a. Shower heads with water saver nozzle with a maximum flow of 2.5 gallon per min. at 60 psig and controls should be located at least 4 feet apart and not more than 6 feet above the floor for senior high schools. Junior high school shower heads should be between 54 and 56 inches from the floor. Vandal proof heads are usually less trouble. Recommended valve height in 45 Inches.

S706-8 Service Sinks

a. In the custodian's closet on each floor and in the custodian's service room, a service sink shall be provided. The sink should be placed low for convenience and have a chip-proof rim. Consideration should be given to the floor-recessed type of mop and service sink which has a rim approximately 8 inches above the floor. Faucets should be installed high enough above slop sinks to permit filling of water buckets. Service sinks should have available a three-quarter inch service pipe for flow of hot and cold water.

S706-9 Drinking Fountains (Also, See Appendix J - Accessibility)

a. Provide water fountains at a ratio of one fountain to 150 pupils, with a minimum of one drinking fountain on each floor having pupil occupancy. Within this ratio of fountains, it is recommended that two fountains be located near the boys and girls adjacent toilet rooms.

b. Drinking fountains should be of an impervious material, of a type that will not permit the mouth of the pupil to come in contact with the nozzle, nor permit the water to fall back upon the nozzle. The fountain jets and all openings in the water supply piping should issue above the level of the fountain bowl rim. Drinking fountain valves must be self closing.

c. Recommended height to nozzles: kindergarten and primary, 24 inches; upper elementary and high school, 32 inches.

d. Fountains shall not be attached to lavatories or sinks and shall not be located in toilet rooms. They should be located convenient to primary rooms, gymnasiums, cafeterias, all purpose rooms, playgrounds and shops. It is not good practice to locate gymnasium drinking fountains and cuspidors within the gymnasium playing area. Water spilled on wood floors creates an unsightly, slippery, and hazardous condition and causes difficult maintenance problems. A better location is in adjacent alcoves or passage areas off the main floor. Where construction permits, fountains should be recessed full depth. In order to maintain clear corridor widths, maximum projections of fountains must be maintained as explained in S103.

e. Drinking fountains may be installed in conjunction with classroom sinks in the following manner: A shallow receptor for the fountain, having a minimum edge clearance from the sink of 6", may be installed in the counter top with its drain draining into the sink drain.

f. Drinking fountains of the frost proof type should be located convenient to the playground area.

S706-10 Floor Drains

a. In the shower and drying rooms sufficient floor drains should be provided and located so that no pupil needs to stand in or walk through waste water. Curbs with their attendant hazards can often be eliminated by judicious location of drains.

b. Automotive shops require floor drains in the center of an area approximately 14 x 14 feet in front of the overhead door. The floor in this area should slope to the drain, and an oil interceptor should be provided.

c. Cafeteria-kitchen floors should have drains where there is spillage or frequent hosing and cleaning is required. Floors under and around steamers and kettles should be drained independently of other floor areas.

S706-11 Outside Hose Fixtures

a. Hose fixtures should be provided around the perimeter of the building so as to provide accessibility of water for sprinkling and for maintenance. Frost proof hydrants here and elsewhere on the school grounds are highly desirable.

S706-12 Piping

a. Long-range economy usually justifies the use of noncorrosive pipe, selected not only for immediate demands but also with a view to possible expansion of the building and its services. Valves and fittings should also be selected with a view to ease of service and replacement. All valves should be tagged for identification and a chart of the piping layout should be readily accessible in the custodian's room. Draining and venting should be in accordance with commonly accepted standards of public work. insulate all hot water piping. PVC plumbing is not approved for use in school buildings.

S707 SPECIAL CONSIDERATIONS

S707-1 Cafeteria-Kitchen

a. In the cafeteria-kitchen provide pre-rinse hot water at 100°F, wash tank hot water at 140° to 160°F, and final rinse hot water (if no chemical sanitizer is used) at 180°F. Dynamic pressure should be a minimum of 20-25 psi.

S707-2 Art Classrooms

a. In art classrooms hot and cold water to sinks (with clay and grease traps) is usually necessary.

S707-3 Agricultural Shops

a. In vocational agriculture a milk testing sink is usually included. This same sink, which should be acid-proof with an acid-proof trap and waste, can also be used as a wash sink by the students.

S707-4 Domestic Hot Water

a. Domestic hot water heaters having a capacity of 400,000 BTU's per hour input or more must be provided with electronic flame safeguard controls in accordance with S602-3a; those having a capacity of less than 400,000 BTU's per hour input must be provided with controls in accordance with S602-3b. Tanks shall be ASME certified and stamped.

b. Where cost effective consider use of separate instantaneous hot water heaters serving separate areas of the building rather than a central hot water source.

c. Provide water at 100°F. to all fixtures except in swimming pools.

S707-5 Illumination

a. See Table S303 and Table S803-1.

S707-6 Ventilation

a. Positive mechanical exhaust ventilation with separate duct system shall be provided from all toilet rooms; except that individual toilet rooms (one water closet, or one water closet and one urinal) located on exterior walls may have window ventilation.

S707-7 Fire and Smoke Control

a. Fire Extinguisher Equipment (See S110-1).

S707-8 Acoustic Considerations

a. See Acoustic Environment requirements Part III.

S708 AIR EMISSIONS

a. Heating plants of one million BTU rated input capacity or more (using coal or oil), and any kind of incinerator installation or other kind of installation capable of polluting the atmosphere must have the approval of the Department of Environmental Conservation Division of Air Resources before final approval by the Commissioner of Education can be given.

S709 GAS FACILITIES

a. See S409; Part IV, Site and Utilities.

b. Outside shut-off valves to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.

c. All gas equipment shall comply with AGA Listing or Approved Requirements and shall bear the listing or approval seal of a recognized testing agency such as the American Gas Association Laboratories, Inc. or Underwriter's Laboratories, Inc. Installation of gas equipment and piping shall be in accord with the applicable American National Standards Institute (ANSI) Code and the rules and regulations of the local gas utility.

d. All gas appliances shall be provided with suitable pressure regulation by approved individual regulator. It is not required that individual bunsen burner outlets be provided with pressure regulators.

e. Gas piping shall not be buried in slabs or under buildings unless there is no other reasonable location available. In such cases the gas pipe shall be encased in a gas tight casing which shall be vented to the atmosphere. Gas pipes shall not be run in or through heating ducts and shall not be installed in plenums where air is being returned to air handling systems for recirculation. Gas piping shall be in accordance with ANSI Z21.30 or Z83.1 (where applicable) and in

accordance with the Public Service Commission Regulations NYCRR, Part 255 and the Federal Department of Transportation, Part 192.

f. Gas Piping Tests

1. Gas piping with a working pressure up to 12" W.C. must be welded for pipe sizes 3" and over. The completed line is to be pressure tested with air or inert gas for a minimum of one hour at 15 psig.

2. Gas piping with a working pressure above 12" W.C. must be welded for pipe sizes 3" and over. The completed line is to be pressure tested with air or inert gas for a minimum of one hour at 1/2 times the working pressure or a minimum of 50 psig.

3. Coated or wrapped pipe must be tested at 100 psig for a time period of 1 hour to insure the gas tightness of the pipe.

4. The source of test pressure shall be isolated before the pressure tests are made. Tests shall be made in the presence of the architect, engineer, or their representative in conjunction with the local gas utility requirements.

g. Utility gas admitted into school buildings shall also be adequately odorized to render it detectable as prescribed by the Public Service Commission. Liquefied petroleum gases shall be odorized as prescribed by NFPA Standard No. 58.

h. Whenever liquefied petroleum is used, special pipe joint compound resistant to liquefied petroleum gas shall be used.

i. Gas piping entering a building shall be sleeved and sealed as stated in S403d.

S710 BUILDING GAS PRESSURES

a. The allowable gas pressures within areas of the school building, other than the Boiler Room, (after the meter and/or regulators) will be the normal 1/2 psig or less service.

b. The allowable gas pressures within the Boiler Room, after the meter and/or regulators, may be up to 2 psig. Normally above 1/2 psig is only required for use in the Boiler Room. It will not be ordinary that gas pressure above 2 psig will be required and requests for utilization of gas pressures above 2 psig pressures will only be considered for approval upon formal presentation for such a request by the consulting engineer of technical reasons to the Office of Facilities Planning.

c. Pressure switches, pressure regulators, and other equipment requiring atmospheric pressure to balance a diaphragm shall be suitably vented to function properly. Over pressure relief valves, normally open vent solenoids, and other similar equipment shall be suitably vented to function properly and operate safely.

d. Gas pressure regulators designed and equipped with vent limiting devices need not be vented to the outdoors. Other gas pressure regulators shall be vented directly to the outdoors.

e. Relief valves and normally open vent valves shall be vented directly to the outdoors.

f. Vent line size

1. Vent lines for gas pressure regulators and other devices requiring venting which do not normally discharge gas through the vent shall be vented to the outdoors through a rigid pipe at least 3/4" in size. Consideration shall be given to increasing the size of the vent lines longer than 20 feet. Manifolding of these vents is allowed providing the cross-sectional area of a common vent line is equal to the sum of the cross sectional areas of the manifolded vent lines.

2. Vent lines for relief valves and normally open vent valves shall be piped directly to the outdoors. (They shall not be vented commonly with devices requiring atmospheric air pressure to balance a diaphragm.) The size of these lines shall be calculated to provide full relief capacity under the conditions of design. The size of such lines shall never be less than the size of the connection at the device. Manifolding of these vent lines is allowed providing the cross-sectional area of a common vent line is not less than the cross-sectional area of the largest individual line plus 50% of the total cross-sectional area of all other connecting lines.

g. Vent termination - All vent lines shall terminate outdoors in a safe place and not less than 18" from any opening or overhang. Adequate means shall be employed to prevent water from entering the vent pipe, and also to prevent stoppage of it by insects or foreign matter.

S711 AREAS OF USE OF GAS DISTRIBUTION

a. Science classrooms - gas outlets at fixed spacing (usually 5 feet) at work counters.

b. Homemaking classrooms - outlets to gas burner type kitchen equipment.

c. Art classrooms - gas outlets at work counters (usually every 30 inches).

d. Gas fired kilns - whenever used, a control valve shall be provided.

e. Kitchens - as required by equipment.

f. Soldering and Annealing - with compressed air if a compressed air torch is to be used.

g. A master control valve shall be provided for the instructor's control in any space having 3 or more gas outlets. This valve may be either a manual or an electrically operated solenoid valve.

h. If gas outlets are in close proximity to water or air outlets, the gas supply pipe shall be equipped with a gas check valve.

PART VIII

ELECTRICAL WORK

S800 GENERAL

a. General Provisions, Section S1 - S14 also apply to this Part.

b. All electrical work shall conform to the requirements of the latest National Electrical Code (NEC), NFPA Pamphlet No. 70.

c. All electrical devices, materials, and packaged equipment shall meet the requirements of a recognized testing agency such as the Underwriters Laboratories, and shall bear its label.

d. Transformer vault rooms, and equipment therein shall conform to the requirements of the National Electrical Code and provision shall be made for adequate ventilation. Outdoor transformers on concrete pads are permitted if totally encased. Installations shall conform to the National Electrical Code.

e. Electrical service lines must be placed underground from the utility company service or must not cross any usable portion of the site or play areas. Overhead electrical service may be extended along property lines or along driveways.

f. Elevators required by S102-1, dumbwaiters, and escalators, shall be designed, constructed, and installed according to ANSI Code A17.1, Parts I through IV and VIII through XIII.

g. The amount of energy consumed for electric power depends upon the magnitude and deviation of the loads, the efficiency of the motors and equipment, the line and transformer losses, and the power factor of the system. Select all equipment for maximum efficiency. Minimize demand loads through priority selectors, demand limiters, load shedding, and closely matching motor sites to the actual brake horsepower demand.

h. Lighting is a major consumer of energy, both for the power required for lighting fixtures and, in interior spaces, for the energy required for air-conditioning to overcome heat from the lights. In the past, quantity of lighting was often equated with quality of lighting, leading to over lighted buildings and excessive energy consumption. Each room should be studied for its needs both in quality and quantity of lighting. Task lighting (or lighting designed for specific areas according to the tasks to be performed), although requiring a more extensive switching system, can cut down on the general foot candle levels in the area.

S801 TESTS

a. Tests of electrical work shall be made as equipment is installed and shall include a run under full load (or a reasonable overload) long enough to determine that no excessive heat will be developed at terminal points, switches, and other points of installation.

b. Complete tests shall be specified and shall be conducted of the fire alarm and exit light systems in the presence of the engineer or architect.

S802 ELECTRIC HEATING

S802-1 Requirements

a. Electrical Space-Heating Equipment for school buildings must meet the general construction and performance requirements of Underwriters Laboratories, Inc. for Air-Heating Appliances, for Duct Heaters, and for Central Heating Furnaces, as well as the specific construction and performance requirements of this Manual. Attention is directed to the specific construction requirements for Guarding of Heating Elements and the performance requirements for Temperature and Abnormal Operation for Air-Heating Appliances. Attention is also directed to the specific construction requirements for Limit Controls and the performance requirements for Temperature and Test Enclosures, for Normal Tests and for Abnormal Tests for Duct Heaters. Also, attention is directed to the construction requirements for Enclosures and Limit Controls and the performance requirements for Temperature Tests for Central Heating Furnaces.

b. All electrical heating equipment shall be listed and marked by the Underwriters Electrical Appliance and Utilization Equipment List for installation in ordinary locations in accordance with the National Electrical Code. Electrical space heating equipment intended for use in hazardous locations, such as paint spray booths, must also meet the construction requirements of the Underwriters Laboratories, Inc., and must be listed by the Underwriters for such intended use.

c. Large open-coil resistance heating elements for use with fans or in air-handling units are required to be installed in heater rooms whose walls, floors, ceilings, and doors must have a fire resistivity of two hours or more. Duct work in heater rooms for such equipment shall be protected with 1 1/2 hour fire rated dampers, or thermal rise detectors, or smoke detectors tied in with the fire alarm system. The electrical installation shall meet the requirements of the National Electrical Code. (Reference in this paragraph is made to large heating equipment which contains open-coil type heating element equipment and which is listed and marked by the Underwriters Laboratories or is designed by the consulting engineer.)

d. Open-coil electric duct heaters may be installed in reheat applications for individual places of pupil occupancy and classrooms. Clearances must be maintained as approved by the standards of the Underwriters Laboratories, Inc.; the duct heaters for this application must be listed by the Underwriters Laboratories Inc. Such duct heaters shall not be accessible nor within reach of the occupants of the school building. A minimum horizontal distance of 24 inches shall be maintained from the outlet of the duct serving such classroom and, where practical, should have a ninety degree (90°) turn in the duct work from the outlet to the duct heater.

e. Fan-coil package heating and ventilating units of the open coil heating element type may also be installed within the individual space where they serve areas such as All-Purpose Rooms, Gymnasiums, or other places of assembly that are not designated as sound-critical areas. See Part III. However, such fan-coil package units must be approved as a package and must be listed by the Underwriters Laboratories Inc. as a fan-coil unit to insure safe and uniform air discharges across the heating coils. Underwriters Laboratories approval of individual components of the package does not constitute approval of the entire fan-coil open coil heating and ventilating unit. These units must not be accessible to the occupants of the place of assembly and must be installed at the ceilings of such spaces or in heater rooms. Clearances must also be maintained as approved by the Underwriters Laboratories.

f. Baseboard heaters, cabinet heaters, and unit ventilators must have heating elements of the enclosed, sheathed, and finned type and must be listed and approved by the Underwriters Laboratories.

g. Electrical heating systems must perform satisfactorily with respect to proper loading, convection, air flow, surface temperatures, clearances and within tolerable noise levels. Precaution shall be taken to avoid recessing heaters not intended for recessing and to maintain Underwriters

Laboratories rated clearances between heating equipment and combustible materials and furnishings.

h. School building temperature controls incorporated with the above Electrical Space-Heating Equipment must operate such equipment safely and must limit air discharge to temperatures prescribed by the latest American Society of Heating, Refrigerating and Air-Conditioning Guide.

S803 ARTIFICIAL LIGHTING

S803-1 General

a. School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light. The minimum acceptable standards are shown in Table S803-1.

b. The use of plastics in light diffusing systems in ceilings is limited. See S205-10.

c. Specify energy efficient lighting equipment which will provide maximum lumen output with minimum wattage consumption.

d. Do not exceed lighting levels adapted to the expected function of a particular room or area. Provide minimum foot candle levels as required by Table S803-1 on the surfaces indicated (task lighting) with, generally, lower lighting levels throughout the rest of the room, but high enough to prevent undesirable contrasts.

e. Investigate the practicality of collecting heat energy generated by lighting equipment to supplement space heating in winter, and expelling it by natural cooling in summer, rather than imposing additional load upon refrigeration equipment.

f. Mercury vapor/metal halide lamps must be of the safety type or self-extinguishing upon the breaking, cracking or removal of the outer shield protecting the lamp. Each lamp or its fixture shall be equipped with a shield adequate to protect against and absorb ultraviolet radiation if the lamp were to break or become defective.

S803-2 Switching

a. It is rarely economical in terms of energy to leave lights burning rather than switching them off and on. Wherever practicable, provide easily accessible local switching. Consider dual level illumination in all teaching spaces, one level suitable for reading and note taking, and a lower level for passive lectures. Provide low level lighting for custodial cleaning of the building. Low voltage switching may be practicable.

b. Compliance with the New York State Energy Conservation Code is mandatory. Automatic lighting controls as required by Section 7813.53 must be part of any project for installation of lighting equipment.

c. Switching of electrical lighting circuits shall be so arranged that interior places of pupil occupancy (without day lighting) shall either be circuited for some continuous lighting directly from the lighting panel, or shall be on key-operated switches mounted on the wall. Such interior spaces may include classrooms, large group instruction areas, libraries, study halls, music rooms, gymnasiums, and toilets. All natatoria (swimming pools) shall have some continuous lighting whether or not daylight is provided.

d. Areas with an occupancy of 50 persons require emergency lighting per Code.

S803-3 Brightness Differences

a. See S302; Part III, Visual Environment.

b. See Table S302 for Recommended Limits of Brightness Ratios.

Table S803-1

Minimum Foot Candle Requirements

Location	Minimum Maintained Foot-Candles	Initial Foot-Candles
Classrooms, study halls, lecture rooms, libraries--on desks, tables, chalk and display boards	30	40
Office--on desks	30	40
Sewing rooms, music rooms, drafting rooms, art rooms and other rooms where fine detail work is to be done--on the work	40	53
Shops, laboratories--on the work	30	40
Gymnasiums, playrooms, swimming pools	20	27
Cafeterias and other similar places if used for study	20	27
Auditoriums	10	13
Corridors, stairs, passageways, and all indoor areas traversed by students	10	13
Locker rooms and toilets	10	13
Sight saving classrooms-on desks, chalk and display boards	50	67

S804 EMERGENCY LIGHTING

a. An automatic emergency lighting system (not necessarily including a generating plant) is required for certain spaces and the exits and exitways from areas of assembly with occupancy of 50 or more persons per Code.

These areas are as follows:

Auditoriums
Large Group Instruction Rooms
All Purpose Rooms and Playrooms
Cafeterias
Gymnasiums
Swimming Pools
Combined Places of Assembly
(combined or open classrooms are not necessarily areas of assembly but do require emergency lighting)
Elevators

S805 EXIT LIGHTS

a. Red and white exit lights shall be provided in auditoriums, assembly halls, gymnasiums, stairways, corridors, and exits with illuminated signs showing the word "EXIT" in plainly legible letters not less than four and one-half inches high and with the strokes of each letter not less than three fourths of an inch in width. Lights shall be located to readily identify an exit and indicate the path of travel to the exterior.

b. Exit signs circuiting shall be on a separate and segregated circuit wired to minimize the possibility of interruption.

c. In sound-critical spaces, exit lights shall be equal to the LED type, emitting no radio frequency transmissions and producing no audible noise.

S806 AUDITORIUM AISLE LIGHTING

a. To provide for proper safety when the auditorium is in darkness, it is recommended that aisle lights be installed on the side of the aisle seats at every third row on the main floor and every two rows in the balcony.

S807 FIRE ALARMS

S807-1 Requirements

a. Supervised (trouble bell-trouble light) fire alarm systems are required for all schools of two classrooms or more. These systems shall be designed to permit operation from convenient locations in corridors at the main exit doors (at same point with the fire extinguishers) and also from areas having unusual fire hazards, such as shops (if over 1,000 square feet, one station for each 2,000 square feet or fraction thereof), cafeteria-kitchens, and boiler or heater rooms, with a practice switch or operation control located convenient to the office for use in fire drills. In these areas fire alarm stations shall be located near exit doors. No point in the corridor shall be more than 120 feet from a fire alarm station. Either manual/electric or automatic/electric systems are acceptable, depending upon the size of the building if the signals are designed to give positive warning to all points of the building, regardless of other noises and activities. The trouble signal of the supervised system shall be located in the main office. Warning signals shall ring continuously until it has been determined that fire safe conditions prevail in the school building.

b. School fire alarm or detection systems, smoke detection systems or sprinkler systems, as

provided, must be interconnected with the fire department reporting location or system affording service to the building. Upon the sounding of a school alarm, such signal shall automatically be transmitted to the fire department reporting location or system. For districts with volunteer fire departments interconnection is not mandatory under Section 807c of the Education Law amended.

c. Any school located in a municipal fire district having a general fire alarm system shall be provided with a fire alarm box on the premises which shall be interlocked with the school system to automatically notify the fire department reporting system. The typical alarm box used in the city, village, town, or fire district is to be located on the premises as directed by a responsible authority in the fire department.

d. The use of strident or panic-producing signals shall be avoided in auditoriums or other areas where panic might occur.

e. Fire alarm stations and gongs shall be on circuits separated and segregated from other circuits, wired to minimize the possibility of interruption and may be in the same panel with the exit light system. Fire alarm devices must be audio-visual.

f. The fire alarm system shall also be interconnected to disconnect motors operating ventilating fans and air handling systems and exhaust fans having a capacity greater than 1000 CFM. (Individual room unit ventilators are not required to be interconnected.)

g. Magnetic Door Holders: (See S807-3.c).

f. Fire alarm annunciator panel must have a plan of the reporting stations mounted immediately adjacent to the panel. New annunciator panels and plans must be located, per Code near a window, so that they may be read without entering the building.

S807-2 Thermal Detection Stations

a. Thermal detectors are recommended for inclusion with fire alarm systems. It is recommended that fixed temperature detectors be provided for kitchens, boiler rooms, homemaking, shops, paint spray rooms and other areas which are hazardous and might experience a high rate of temperature rise in a short period of time. It is also recommended that rate-of-rise detectors be provided in storage rooms, janitor closets, main stages, attics, fan rooms, and other areas which have potential hazards would not experience a high rate of temperature rise in a short period of time. Generally, fixed temperature detectors are preferred, unless holding circuits are provided in the enunciator to hold in the detector which has been energized and thereby prevent cycling.

S807-3 Smoke Detection Systems

a. A smoke detecting system is required for those areas, or plenums, having unusual chimney effects for smoke and fire, such as stairwells and warm air heating and ventilation systems. Smoke detection systems must be interconnected with the fire alarm system to automatically sound the internal fire alarm system as well as the municipal fire alarm system, or the fire department reporting system.

b. Open-planned buildings and buildings with interior pupil spaces are be required to have a smoke or fire detection system monitoring defined corridors, certain interior places of pupil occupancy, and places of assembly as deemed necessary, depending on the design of the building. Such systems then shall be integrated with the school fire alarm system and with the fire department

reporting system.

c. Magnetic door holders normally holding doors in the open position must be interlocked with the fire alarm system so that, upon sounding of an alarm, the magnetic door holders will automatically allow the doors to close. Smoke detectors must be provided at the smoke enclosure and these smoke detectors also must be interconnected with the fire alarm system. (See S109-4.c).

S808 AREAS OF SPECIAL ELECTRICAL NEEDS

a. Home and Careers - 220 volt service to electric ranges, ovens, and clothes dryers.

b. Science - 110 volt outlets at frequent intervals over work counters and at work stations. (Incorporation of outlets in laboratory cabinets is a common practice.)

c. Commercial Areas - floor outlets for electrically operated office equipment.

d. Art - 110 volt outlets at 8 to 10 feet over work counters.

e. Electric Kilns - usually on a separate 220 volt circuit.

f. Shops - 220 volt, 3 phase power is more efficient for electric motors of 1/2 horsepower and up. Welding usually requires 220 volt, 1 phase power.

g. Kitchen - as required by equipment. 220 volt, 3 phase power is usually provided.

h. Stages - as required by the program.

i. Audio-Visual - 110 volts, 1 phase, 20 ampere circuits for machines of 1200-1500 watts.

j. Finishing Rooms - areas such as finishing rooms used for brushing of paint and/or containing paint spray equipment shall have explosion-proof motors, non-arcing switches, and explosion-proof outlets and fixtures. Package paint spray booths may be used at secondary school levels where paint spraying is limited to small projects. For larger student projects, separate finishing rooms are required. Such explosion-proof equipment must be Underwriter's Laboratory approved and listed. Package paint spray booths equipment must also be U. L. approved and listed.

S809 INDUSTRIAL ART ROOMS

a. Lighting fixtures for industrial art rooms shall be of a type in which the maximum surface temperature of the lamp or tube does not rise above 165°C. Shielding of the lamps from accidental blows must also be provided.

b. Woodworking machine tools shall be provided with dust-tight plugs and receptacles, or shall be provided with a rigid to flexible permanent connection. Dust-tight motor starters are to be provided on such equipment.

c. Shaving or dust collecting devices shall be inherent within woodworking machine tools or otherwise some vacuum collecting device shall be attached for the gathering of shavings and dust particles.

d. Motors attached to woodworking machine tools shall be the self-enclosing type.

e. Shop emergency switches are required and shall be located one (1) on each wall of the industrial art room to de-energize the power panel in emergencies.

f. Where operations of a teaching space produce dust and fumes, precautions must be taken to avoid harmful and unsafe concentrations in the air. Such safeguards include dust collection devices inherent in the machine tools or dust collection systems for woodworking activities; and provisions for positive ventilation with hoods and duct systems for finishing rooms, welding areas, grinding operations, and automotive repair areas. Automotive areas where more than 3 vehicles are, or may be, stored shall have mechanical carbon monoxide Exhaust systems.

g. Carbon monoxide detectors should be installed in areas which could be subject to such exposure.

S810 LOCKING DEVICES

a. Lighting and power panels shall be provided with locking devices and index cards showing circuits controlled by each breaker or switch.

S811 TELEPHONE

a. A public telephone shall be provided in all school buildings having pupil occupancy.

S812 ELECTRICALLY OPERATED PARTITIONS

a. Electrically operated partitions must include two remotely located, key-operated, constant pressure control stations. Other safety controls may be provided.

b. Life safety and operation of electrically operated partitions must follow the following minimum guidelines:

1. Safety features must never be tampered with,

2. staff must be appraised of safety features and trained in the safe operation of movable partitions,

3. students must be under direct staff supervision while the partitions are being operated. Students should stand away from and not be allowed to cross between adjacent rooms while the partition is in motion, and

4. all equipment must be maintained in accordance with manufacturer's instructions.

c. Electrically operated partition signs are required to be posted. The Education Law is amended by adding a new section 409-d. This law was signed on June 23, 1992 and reads as follows:

1. Electrically operated partition and door safety. The board of education, trustees, principal or other person in charge of every public or private school or educational institution within the state, wherein classrooms or other facilities used by students are found to have electrically operated partitions, doors or room dividers, shall arrange for and require, that:

2. Appropriate and conspicuous notice regarding the safe and proper operation and supervision of the electrical device operation such partition, door or room divider is

posted in the immediate vicinity of the operating mechanism; and

3. Establish a procedure for the notification of all school employees and all other persons who regularly make use of the area where such device is located in the safe and proper procedure for the operation of the mechanism.

PART IX

EXISTING BUILDINGS

S901 General

a. Existing educational facilities in all school districts except in cities of one-hundred twenty-five thousand, or more, population, shall comply with Section 155.3 of the Regulations of the Commissioner of Education to insure the health, safety and accident protection of occupants.

b. The Regulations are printed in Appendix D.

c. School buildings are classified as Class "A", "B", or "C" construction as defined by the Local Finance Law. See Appendix A and C.

PART X

PROCEDURES FOR DESIGN AND CONSTRUCTION

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S1001 LEGAL SERVICES

Legal counsel will be required for some phases of a building project and may be desired on others. A local attorney competent in the unique problems related to building construction should be retained, one who has the time and is willing to attend meetings and conferences as required and to advise the board as necessary. Legal problems involved in the acquisition of a site will be more or less complicated depending upon conditions. If the simple purchase of a site is involved, there will be the matters of contract to purchase, title clearance, drawing of deed, recording of deed, and other similar problems. If, however, acquisition of rights-of-way or condemnation proceedings are necessary, there will be much more work required by the attorney. Bonding attorneys should be retained before the call of the district referendum so that all notices, resolutions, and votes will be in accord with bond sale requirements. The selection of bonding attorneys is important for several reasons. Attorneys accustomed to handling bond issues will prepare all required resolutions, ballots, advertising and other documents to assure the legality of each step in the program.

They will be helpful in determining the period of probable usefulness of the project; i.e., maximum term of bonding, which will affect the local tax rate. Additionally, the standing of the attorneys with bond buyers will assure the school district that prospective bidders will accept the information provided and enter the best bids possible.

The local school attorney may make the contacts with the bonding attorneys and provide liaison between the board and the attorneys. If the selection of the bonding attorneys is made early and with proper care, the local attorney will have little work with the bond issued under ordinary circumstances.

Competent advice should be secured from bonding attorneys and possibly from an unbiased bond buyer as to the time for, and the conditions of, the sale of the bonds. It will be necessary to see that the advice does not prejudice the sale in favor of particular bond buyers. The proper timing of a sale in relation to other issues being offered, sometimes at a considerable distance, may affect the bids and the price considerably. In general, a time for the sale should be selected that is removed by at least a few days from the sale of any other large issue.

The law requires that the bond award be made first upon the low interest rate. If two or more bidders

quote the same lowest rate, the award will be made to the one offering the highest premium (Local Finance Law, section 59.00).

The rating given a school district bond issue by a service such as Moody's or Dun and Bradstreet is important in achieving a successful sale. Local school authorities should, therefore, cooperate fully with such services and with bonding attorneys in supplying all information requested.

The Education and Local Finance Laws specify the requirements as to deposit and custody of proceeds of the bond sale. The funds must be deposited in a special account, and any balance remaining after the completion of the project must be retained for retiring the bonds as they come due and for paying interest on the bonds (Local Finance Law, section 165.00).

The architect should prepare advertisements for construction bids, advise the board regarding bids and bidders, and assist in drawing up contracts for construction. Standard forms of contracts will probably be used. The board should have its attorney examine and approve these advertisements and contracts.

In engaging legal services, it is desirable to have a complete understanding of the services to be performed and fees to be paid. The cost of legal services is a part of the cost of the project and is included in the building budget submitted with the plans to the Office of Facilities Planning.

Fees vary somewhat with the locality and with the size of the project. In general, the fees of bonding attorneys are based upon a percentage of the amount of the bond issue; the amount of the fee may also vary with respect to the number of propositions involved or if the particular financing presents unusual problems.

S1002 ARCHITECTURAL/ENGINEERING SERVICES AND RESPONSIBILITIES

a. The architect/engineer should be employed at the inception of the building study so that he may have the opportunity to understand fully the problems to be solved. When building needs have been determined, the architect/engineer becomes a key figure in carrying out any project.

   1. As previously stated, the professional service of an architect or engineer is required for all public work when the cost of such work exceeds $5,000, and all plans and specifications required to be submitted to the Commissioner must bear the seal and signature of the architect or engineer.

   2. In the remainder of this guide the term architect/engineer, (A/E), will be used as a matter of convention. The term "architect", "engineer", or "architect/engineer", in the case of a joint firm, may be substituted, using whichever is most applicable.

b. Selection of Architect/Engineer

   1. An A/E should be selected with the same care and method employed in appointing any specialist such as a physician, lawyer, or chief school officer. Architecture and engineering are professions, and commissions should be on a professional basis with due regard to loyalty, integrity, competency, office organization, and staff capacity for performance, personality, design excellence, and past performance in the design and supervision of like facilities.

   2. Board members and school staff personnel should visit school buildings designed by A/E firms in which the board is interested. In visiting schools, features should be observed with respect to current needs. Developments in school planning keep pace with

developments in other fields, and what may have been an excellent plan some years ago may not meet present-day criteria of educators or the A/E. When visiting buildings, questions should asked of board members, superintendents, principals, teachers, custodians, and students. For instance:

i. Is the building satisfactory?
ii. What faults have been found?
iii. How did final costs compare with original estimates?
iv. Did the A/E show willingness to consider suggestions, and were adopted suggestions successfully incorporated?
v. Does the structure allow for flexibility of educational program and efficient and economical operation and maintenance?
vi. Was the A/E professional ethical and businesslike in relations with the school board, administrators, contractors, and material suppliers?
vii. Does the A/E have the staff, qualities of leadership, and personality necessary to get things done satisfactorily and in a timely manner?

3. As a result of visits to other buildings it may be possible to make a tentative selection of an A/E or at least reduce the number to be considered. The board should then consult with one or more of those under consideration. Ample time should be allowed for conferring with each, and there should be an opportunity for each to explain the services of the firm and related fees and show illustrations of some representative work. It is not wise to have more than one A/E appear for an interview at the same meeting.

i. An A/E should not be asked to give design solutions and cost estimates prior to the time he has been retained, knows the program and problems to be met, and has given consideration to preliminary schematics. Competition for selection on the basis of illustrations is not recommended, even if the competition code of the American Institute of Architects is followed. Competition solely on the basis of fee to be charged without an understanding of the services involved also is ill-advised.

ii. An A/E firm with little or no experience in school planning should not be ruled out solely because of lack of experience in the school field. Rather, a firm should be judged on competence, resourcefulness, imagination, and its record and reputation in other areas of A/E planning.

iii. With the present emphasis on reconstruction and alteration work, particularly as it relates to conservation and efficient use of energy resources, a board of education should be aware that there are A/E firms that are specialists in these areas. It should be determined whether a given firm has had successful experience with such projects from the standpoint of analysis, design, and proven results.

c. <u>A/E Service</u>

1. The professional services of an A/E generally consist of necessary conferences; preliminary studies and estimates of cost; working drawings, specifications, scale detail drawings for architectural, structural, plumbing, heating, electrical, and other mechanical work; assistance in the drafting of forms of proposals and construction contracts; taking of bids; recommendations of award; checking of shop drawings; issuance of certificates of payment; accounting and general administration of the contracts; and supervision of the work as necessary for its satisfactory completion in accordance with the contract documents.

2. In modern buildings, structural, heating, ventilating, air conditioning, electrical, and plumbing designs are detailed and complicated. Normally, these phases of work, especially in the areas of energy conservation, are handled by professional engineers. These engineers may be on the staff of a typical A/E firm, or the architect may engage consulting engineers to work inter-professionally with him. In either case, the service is normally part of the architect's fee. The current form of contract recommended by the American Institute of Architects provides that engineering services (structural, heating and ventilation, electrical, and plumbing) should be included in the architect's basic fee. The school board should know in advance of the contract signing the names of the engineers on the project before the contract is signed.

3. When the project largely involves heating, ventilating, air conditioning, plumbing, sewage disposal, electrical work, or structural work, the board of education may choose to retain a professional engineer who, in turn, will retain any necessary professional architectural assistance.

4. The degree and extent of services may vary between individual A/E firms. The organization and expertise of some firms may offer possible services not available from others. Even the fundamental concept of what is included as basic service for basic fee may differ from one firm to another.

5. Numerous kinds and types of services are available from the A/E. It is not implied that all services available are necessary for the successful completion of a building project, and, typically, the type and scope of services will vary with the type and scope of the project. A board of education must know which services they desire, require, or expect from the professional and, especially, which services are, or are not, included in the basic fee. Only with such information at hand can a board of education make the realistic appraisal and comparison of A/E firms during the selection process.

6. Many of the various services available from an A/E are indicated below. A review of these will be useful in assisting the board of education in selecting, acquiring, and managing the services necessary for the project proposed.

d. <u>List of A/E Services</u>

1. School boards and chief school administrators may find the following list useful in selecting, acquiring, and managing the many services available from architects and/or engineers. Many of the items in this list are basic architect/engineer services. Whether or not a specific, desired item is included as a basic service should be determined at the time of the interview with the architect/engineer.

a. Long-Range Conceptual Planning
   - i. Population trends
   - ii. Enrollment Projections
   - iii. Geographic location of buildings
   - iv. District-wide facilities analysis
   - v. New facilities
   - vi. Additions and alterations
   - vii. Architectural program
   - viii. Maintenance and repair programs
   - ix. Technology

b. Feasibility Studies
   i. New construction
   ii. Additions
   iii. Alterations, reconstruction
   iv. Surplus buildings
   v. Disposition - appraisal, demolition - alternate use/users
   vi. Interim facilities
   vii. Phasing-scheduling of construction
   viii. Maintenance, repair, operation
   ix. Cost/worth analyses
   x. Fiscal implications

3. Site Evaluation, Selections
   i. Analysis - Locations, Alternate sites, Costs
   ii. Size-expansion Development
   iii. Professional analysis services
   survey, storm and sanitary, hydrology, landscaping, soil analysis, ecology, traffic pattern considerations

4. Existing Facilities Analyses
   i. Health, comfort, and safety regulations - educational space adequacy, condition, utilization, flexibility, expansion, insulation, acoustics, finishes,
   ii. Structural
   iii. Heating, ventilating, Air Conditioning - fuel rates, energy conservation, Heat recovery
   iv. Plumbing and Sanitary - interior, exterior, fire protection
   v. Electrical - power distribution, lighting, communications, fire alarm, security systems, energy conservation
   vi. Solid waste disposal - maintenance analysis, operation analysis, personnel training
   vii. Develop drawings - if none available

5. Building Program
   i. Scope - role & responsibilities of architect/engineer/owner
   ii. Research - case studies
   iii. Alternatives analysis
   iv. Cost-analysis - initial vs long-range, cost estimates
   v. Schedule
   vi. Conceptual Design - schematics, plans, renderings, brochures, models
   vii. Functional layouts - space planning
   viii. Materials and systems selection
   ix. Review of constructabilty - structural system, materials, mechanical and electrical systems, temporary service systems
   x. Construction project schedules
   xi. Contract documents-working drawings and specifications
   xii. Bid documents (for building program)
   xiii. Pre-bid meetings and addenda
   xiv. Market conditions - evaluation concerning bid date
   xv. Bid Analysis - apparent low bidders investigation, award recommendation
   xvi. Expedite Education Department approvals - Expedite

6. Contract Administration
   - i. Preparation of contracts
   - ii. Job safety considerations
   - iii. Review bid bonds - performance bonds, labor, material bonds
   - iv. Review required insurance coverage - policies, determine insurable values
   - v. Job meetings
   - vi. Establish accounting control and procedures
   - vii. Check provision of temporary services
   - viii. Administer change orders-verify costs and or/credits
   - ix. Obtain progress schedules from all contractors
   - x. Correlate the progress of the work
   - xi. Expedite settlement of contract disputes in concert with owner
   - xii. Periodic on-site inspections - establish quality standards, ascertain if work is in accordance with contract documents
   - xiii. Continuous on-site inspection
   - xiv. Certification of substantial completion
   - xv. Punch list
   - xvi. Final inspection
   - xvii. Final certificate of payment

7. Post Construction
   - i. Building evaluation
   - ii. Performance monitoring
   - iii. Continued maintenance consultation
   - iv. Maintenance and repair schedules
   - v. Operational instructions
   - vi. Personnel training

e. Supervision During Construction

Due to an increasing number of liability judgments in recent years based on literal court definitions of "supervision," many A/E firms are reluctant to even use the word. In fact, reference to the term "supervision" is omitted from standard American Institute of Architects forms. The basic problem is the lack of a universally or legally accepted definition. Nevertheless, supervision of construction is required on all public works projects when the safeguarding of life, health, and property is concerned (Education Law section 7209, subd. 3; section 7201, and section 7301). Such supervision must be rendered by A/E firms even if it is called something other than "supervision."

By making periodic visits to the site, the A/E will determine if work is in accordance with the contract documents. The A/E will endeavor to guard the board of education against defects and deficiencies in the work of contractors, but he does not guarantee performance of the contractors or construction methods and procedures.

Such professional supervision by the A/E is distinguished from the full-time, on-site endeavors of a full-time project representative who is retained to provide extensive representation on the site. This subject is covered in more detail in "Supervision During Construction."

Another factor influencing public school construction is a 1967 Oneida County court decision (282NYS, 2d. 385). An excerpt from this decision reads:

"Specifications for bids and contracts for the construction of public building totaling over

$50,000 must be drawn and awarded separately for (a) plumbing, (b) heating; (c) electricity (General Municipal Law, section 101;...). This means that the over-all co-ordination and supervision must be performed by the municipal corporation...by its own architect or agent, and that the specification and the contract awarded to the general contractor cannot delegate such supervisory responsibility to him or her..."

A more recent decision involving the City of Syracuse (40AD, 2d. 584) reaffirms this principal. The full text of these decisions should be discussed with the local school board attorney to determine their affect on the specifications for any school construction project.

In effect, the responsibility for the expeditious progress of the work and the coordination of the work of all contractors cannot be assigned to a prime contractor, historically the contractor for general construction. In the final analysis, the responsibility rests with the board of education. Typically, expediting and coordinating the work and the related administration of the construction contracts is beyond the usual basic services performed by the A/E. Therefore, the board of education may be required to retain additional services. Such services are available from A/E, contractor, or specialty firms sometimes called construction managers.

The services listed above encompass a project from inception through completion. The board of education must determine which services are essential and who is charged with providing the service in order to avoid the duplication or overlapping of the responsibilities of the A/E and the agent performing the administration and management of the construction contract.

f. Architectural/Engineering Contract

The relationship between the board of education and the A/E should be formalized by a written agreement as soon as the board has selected the A/E. Such an agreement should be clear as to the extent of services required and expected by the board. In this connection, the board should consult its attorney before agreeing to accept any standard form of contract whether prepared by the American Institute of Architects or anyone else. The attorney should explain the terms of such forms to the board and may suggest alternatives or additions. Since the A/E will do considerable work in the preparation of preliminary plans and estimates before it is possible to vote on the proposition, it is recommended that the contract provide for payment for this work even through the vote may be unfavorable. Such an arrangement may be regarded as ordinary contingent expenses. Its legality has been established by the Office of Counsel, State Education Department (Education Law, section 2023).

The A/E is entitled to be paid for work done and should not be expected to prepare the preliminary plans and prepare for the district referendum with payment contingent upon a favorable vote and approval to carry through with the project. Likewise, he should not be expected to provide any number of major redesigns or completely new schemes without increased compensation. It is important that definite agreement be reached in this regard and reflected by language in the contract.

The contract should be definite in regard to the rate and time of payment as well as to the services the A/E should perform. This tends to prevent future misunderstandings.

The second part of the contract, covering final plans and specifications, award of contracts, and the construction of the building must be on a contingent basis, since this cannot be pursued in a non-city district without a favorable vote.

Since it is possible that there will be one or several unfavorable votes, it is necessary to include

a termination clause in the contract. If attempts to secure approval of the building proposition extend over 2 or 3 years, there may be a change in the personnel of the board and the new board and the A/E may not be in agreement. A provision in the contract should cover such circumstances, allowing the contract to be terminated and payment made for services already rendered.

The board of education is expected to provide all necessary test borings, topographic maps, boundary surveys, percolation tests, locations of utilities, water wells, and similar information as may be required.

If the A/E is to design or specify the equipment for the building, this arrangement should also be in contract. If he does not select the equipment, he should be kept informed at all times regarding the equipment plans as they will affect his work and that of contractors who will provide any necessary service connections. Cost of equipment is usually a part of the building budget, and, since the A/E must keep within the budget, he must know equipment costs.

Fixed or built-in equipment such as corridor lockers, kitchen equipment, cabinet work and laboratory furniture, and auditorium seating generally must be planned by the A/E or by the board in close cooperation with him. Layout of equipment and provision and location of services require studied coordination. Also, design and color of equipment and of the room in which it is to be placed are interdependent. Poorly matching finishes and arrangements, inaccessible utility services, and unnecessary costs may result from a lack of cooperation between the A/E and the board. Generally, the A/E should not be expected to plan and lay out equipment that he is not going to specify and put out for contract unless he receives increased compensation.

The knowledge and maintenance experience of the superintendent of buildings and grounds could also be of value in the early stages of equipment planning.

The A/E may be able to provide plans for landscaping and site development. If this is the case and the board wishes to have him assist in this work, it should be stated in the contract. Even though he does not provide plans and specifications for this work, he should be furnished complete information of the work planned by others. The finished project will be more pleasing and effective if landscaping and site development are planned with the building.

The contract may also indicate the number of sets of plans and specifications to be provided within the established fee. While a deposit must be required on the part of the bidder for the return of plans, all deposits from bidders should be refunded after contracts have been awarded and plans have been returned. Partial reimbursement may be made to non-bidders (General Municipal Law, section 102).

It is desirable to have an approximate time schedule for completion of the various phases of the project. This will indicate the amount of time to be allowed for development of preliminary plans and preparation for the district meeting as well as the time required for completion of plans, the securing of bids for construction, and the estimated construction time. It will not be possible for the A/E to be wholly accurate in presenting such a schedule, but the board of education should know that the work will progress without undue delay. If the A/E has so many projects underway that delay on the local work may be expected, this condition should be understood by all concerned.

The A/E is the representative of the board of education in seeing that construction work is carried out in accordance with the intent of the contract documents and, in general, protecting

the best interest of the board during the course of construction. In this regard, the board's use of an A/E retained by a proprietary manufacturer or supplier only to satisfy statutory requirements cannot be regarded as good business.

S1003 APPROACHES TO CONSTRUCTION

a. General

A method of construction known as the Multiple Contract System was mandated in 1909 on all political subdivisions of this State, including public school districts engaging in the construction of public buildings. The Legislature has departed from this in only a few instances for public authorities, although private enterprise rarely utilizes the public multiple contract system in advancing private construction programs. General Municipal Law, section 101 requires the preparation of separate specifications and award of separate contracts for certain functional classifications of work to be performed on-site. In simpler times, the multiple contract system was adequate. However, if not tightly administered, the system was a target for litigation.

With the passage of time and with construction costs increasing rapidly and radically, public owners sought to cope with delays and cost over-runs by utilizing innovative methods for managing construction as well as improved building materials systems. For a period of time, 1957-1967, the median square-foot cost of public schools constructed in the State remained remarkably constant despite increases in cost of on-site labor. This phenomenon is attributed to the application of design improvements by the A/E profession as well as competitive forces at work in the marketplace. Also, manufactured systems of components were substituted for traditional materials formerly utilized in the construction of public schools. But, commencing in 1967, cost savings were no longer possible through astute application of the design arts, and the cost of public school construction rose.

Frustrated by delays in completion and costs in excess of budgets, school boards sought relief. Professionals, research organizations, non-professionals, and academicians came forward with proposals supported by the trade media as the answers to a public school board's problem. To be fair, many of the proposed management systems and technical improvements recommended for use by public schools in constructing facilities had been utilized by private clients on a regular and continuing basis. Thus, there was no "reinvention of the wheel" nor the "development of a better mousetrap."

The mandates of the competitive bidding statutes and certain restrictive trade practices endemic to the construction industry make it difficult to introduce innovative managerial and technological approaches to the construction of public buildings, including schools. Nonetheless, there are those school boards that have taken advantage of the possible while rejecting the impossible. These boards have scrupulously adhered to the provisions of the law, reflected in their program the advice of the pragmatists among the design and construction professionals, and as a result, reportedly have enjoyed cost and time savings in their programs. Others ignored advice and found their programs in disarray.

This short brief on the several contracting methods and submethods should serve to provide a "word to the wise." School boards interested in additional information should consult with the Office of Facilities Planning as well as with counsel of the local district before embarking on school construction programs. Techniques and systems utilized by private owners cannot readily be applied to the public construction scene. Nonetheless, certain management systems, methods, and materials have been adapted for public use in an effort to assure savings of public money and time. These systems include:

b. Multiple Contract System

"Separate specifications shall be drawn and separate awards shall be made for..." three classifications of construction work. General Municipal Law, section 101, which in turn refers to section 103, the so-called "low responsible bidder" statute, mandates this system on political subdivisions, which includes school districts. Over the years, the typical public school construction project required the services of the design professional, four or more separate prime contractors, and an on-site administrator sometimes referred to as the "Clerk of the Works" or "Architect's Full-time Project Representative."

c. Managed Multiple Contract System

Starting in 1963, the Health and Mental Hygiene Facilities Development Corporation and the State University Construction Fund found it difficult to secure competitive bids for megastructures highly complex in nature. Few contractors were interested in "putting all their eggs in one basket" by engaging in time-consuming projects with future construction costs uncertain, to say the least. Then commenced the letting of multiple prime contracts on a staged or phased basis, with all contracts coordinated and expedited by agents of the owners - typically general building contractors experienced in management of staged projects financed by private owners. (For continuity in the balance of this publication, the function of such agents will be referred to as "construction management." Note that such services are available from A/E, contractor, and specialty organizations that have assembled the necessary expertise). Today, the principal public benefit corporations utilize construction management systems when size, scope, and complexity of project warrant its application.

i. There are no statutory barriers to the utilization of construction management or construction managers by public school districts, but several words of caution are in order:

ii. There is strong competition in today's marketplace for available work. Construction management should be considered for projects that are not easily marketable because of the size, scope, complexity, and time considerations.

iii. A school board should select the construction manager who has demonstrated experience in scheduling, cost control, and plan and specification review, with qualifications to direct, coordinate, and expedite the work of the separate prime contractors awarded contracts as low responsible bidders.

iv. School districts must be aware of the responsibilities and prerogatives of the licensed professional as well as the wording of the competitive bidding statutes before entering into a construction management program.

v. Within the so-called "General Conditions" of a construction project, there are items that require "work" in the historical sense of provision of labor and materials. There must be a definite identification of these items and agreement among the board of education, the A/E, and the construction manager as to who shall perform such work and how the work will be pursued. These are items that historically were included in a general construction contractor's overhead; i.e., snow removal, temporary enclosures, safety programs, dewatering, etc. Such types of work might well require competitive bidding, and the accomplishment of such work by the construction manager might be challenged by various contractor's organizations.

d. Phased Construction

In an effort to save time and money several school boards, within the procedures of the Managed Multiple Contract System, have opted for an approach to the construction process termed "staging" or phasing of the design and construction; a management system of sequential bidding sometimes termed "fast-tracking". As plans and specification for a segment of the proposed construction are completed, construction bids are taken for that segment. Thus, there is overlapping of design and construction, and sophisticated management must be applied to assure the benefits contemplated. Again, a word of caution is in order. There are those projects which might well have enjoyed lump-sum bids prior to the onset of gross inflation, but which were phased. Later segments of a project may bring prices in excess of those anticipated initially. Boards of education are reminded that the total approved appropriation cannot be exceeded; therefore, sufficient funds and careful cost accounting throughout the project are essential. Further, the board should be prepared to budget the added costs occasioned by changes found to be necessary as plans are developed for later stages of the work.

e. Design-Build

Several public and quasi-public agencies have developed design-build programs that ostensibly meet the requirements of the multiple contract and other competitive bidding statutes. Proposers, often professional/contractor teams, are invited to respond to criteria proposed by a public owner for contemplated construction. Each proposer is to submit designs of work to be done and to construct the work in accordance with the design. It is alleged, and at least two court decisions support the allegation, that public design-build proposals are deficient in that competitive bidding statutes require a political subdivision to provide complete plans and specifications for the work to be done. Contractors' organizations hold that it is impossible to objectively select the lowest responsible design-build proposer and such contractors' organizations regularly challenge public design-build proposals.

f. Turnkey

This contracting method contemplates the provisions of design and construction by a single entity, as does the design-build method, but turnkey programs also contemplate land acquisition, financing, and leasing or sale by the proposer to the school district. There is no authority for school district utilization of the turnkey method (Education Law, section 1726).

g. Guaranteed Maximum Upset Price

In this method, the contractor guarantees an agreed upon maximum price will not be exceeded. Although such a proposal has recently been the subject of discussion between school boards and contractors, boards are reminded of legal requirements for public advertisement, separate specifications, and separate award of contracts for public school projects. There are those who would challenge a guaranteed maximum proposal as a subterfuge to evade the multiple contract requirements of General Municipal Law, section 101. As with design-build and turnkey methods, the guaranteed maximum method is adaptable to private work, but difficult, if not impossible, to apply to public school construction.

h. SYSTEMS

School boards will often hear of the efficacy of "Systems" construction. The word "system" describes a design which lays out a building structure in repetitious, modular forms or, in another context, it may describe integrated systems in a building structure, such as a ceiling

system composed of ceiling material, hangers, air outlets, lighting fixtures, and air-distribution ducts. Such integrated systems may be constructed of components that are field-assembled or manufactured off-site. Care must be taken to specify erection of such systems in accordance with requirements of the competitive bidding statutes.

S1004 THE DESIGN-BUILD PROCESS

The design-build process of the Office of Facilities Planning could also be known as the "Building Permit System" or the "Project Manager System."

The emphasis of the process is planning; planning on the part of school districts. In this regard, the kinds of projects received have been divided into two types.

a. Type A projects encompass reconstruction type projects of work done in or on in existing building roofs, boilers, asbestos, etc. The district must give the Office from one to two years' notice of the intent to advance such a project.

b. Type B projects involve the acquisition of new facilities, both new buildings and additions. In this instance the Office needs two to three years' notice. A so-called temporary, portable, relocatable, mobile, or trailer-type classroom,is designated a "manufactured building," by the Office and, whether leased or purchased, is a Type B project. All Type B projects must be consistent with a district's long-range facilities plan, which is required by Section 155.1 of the Commissioner's Regulations.

To enter the design-build process, the Chief School Officer must send a Letter of Intent (LOI) to the Bureau. The LOI should be sent as soon as the district begins thinking about a project, or projects, and, in any case, before the Board of Education takes any formal action(s).

Upon receipt of the LOI, a Project Manager will be named to assist the district through the entire process and a project number will be assigned to each identified project. Essentially, the Project Manager will be your contact person in Albany, available to answer any questions you may have, and to help facilitate and expedite the approval of plans and specifications when they are submitted later in the process.

Early in the process, and in addition to necessary forms, the Project Manager will send an "Instructional Guide for Obtaining Approval of Plans and Specifications by the Commissioner of Education." It describes the specific exhibits necessary for a complete submission.

The guide also explains the Education Department's administration of the New York State Uniform Fire Prevention and Building Code. The major points of this administration include the Building Permit, which is issued at the time of approval of final plans and specifications and, in the case of new buildings and additions, a fire inspection at the completion of construction that will lead to a Certificate of Occupancy. The Building Permit must be prominently displayed at the job site before work commences. A Certificate of Occupancy must be posted in the building before the building can be occupied by anyone other than workmen.

S1005 LONG-RANGE PLAN FOR EDUCATIONAL FACILITIES

Each public school district and BOCES is required to develop and keep on file a comprehensive long-range plan pertaining to educational facilities. This is in accordance with Section 155.1 of the Regulations of the Commissioner of Education. This plan shall be re-evaluated and made current at least annually.

Some school districts have confused this long-range plan for facilities with the long-range school district plans which were required prior to 1985 under Education Law Sections 1608 and 176a, which have since been repealed. The long-range facilities plan required by Section 155.1 is in effect.

To plan properly for such areas as staffing, budget, and transportation, as well as for facilities, long-range planning is a must.

Planning for the future is a continuous process which takes into consideration up-to-date data, appraisal of existing conditions, and review of on-going programs.

Long-range building plans are particularly important because of the life expectancy of the educational facility. Educational programs are constantly changing and so facilities in their original design must take into consideration their potential long-range use.

According to Section 155.1 of the Regulations, the long-range educational facility plan shall include appraisal of the following:

a. The educational philosophy of the district, with resulting administrative organization and program requirements.

b. Present and projected enrollments.

c. Special education, pupil projections, and classroom needs.

d. Space use and State-rated pupil capacity of existing facilities.

e. Priority of need of maintenance, repair or modernization of existing facilities, including consideration of the obsolescence and retirement of certain facilities.

f. The provision of additional facilities. When a school district decides to construct a new school, add to an existing school or substantially alter the educational spaces in an existing building, a copy of the long-range plan for facilities must be submitted to the Office of Facilities Planning at the time of or prior to the required submission of preliminary applications and plans. See the more complete discussion in Unit 5.

g. Inclusion of technology including provision of cabling and conduits when walls are opened during reconstruction or modernization.

S1006 STATE ENVIRONMENTAL QUALITY REVIEW ACT

Before taking action on any proposed project, school districts must satisfy the requirements of the State Environmental Quality Review Act (SEQRA). By Section 155.5 of the Regulations of the Commissioner of Education, the New York State Education Department assumes lead agency status for administration of these requirements.

School officials must complete all the applicable requirements of SEQRA prior to seeking voter authorization for financing capital construction projects. Special meetings to approve borrowing for capital construction projects should not even be scheduled until the appropriate SEQRA process has been completed. Propositions or budget items concerning capital construction project authorization or borrowing should not be introduced at annual meetings unless the appropriate SEQRA process is completed. City boards of education should not authorize financing of capital construction projects unless the appropriate SEQRA process is completed.

The New York State Environmental Quality Review Act requires a board of education to assess the probable environmental consequences of its proposed actions as early as possible in the formulation of a proposed action, including capital construction.

In order to assure that the SEQRA process is properly executed, school officials should send a letter of intent (LOI) and obtain a project number from the Office of Facilities Planning for every proposed capital project. Do this well in advance of seeking authorization for the project from either the board of education in a city school district or from the voters in a non-city school district. When a project number is assigned, the Project Manager will advise school officials about how and when to submit information that is necessary for an Education Department assessment of the environmental impact of the project.

The information must be provided by school officials, for each project, to the Education Department on a "Project Description" form sent to school officials by the Project Manager. Following the Department assessment for each project, a copy of the assessment form will be returned to the school district. If a full scale environmental impact statement is required, school officials will receive special instructions concerning proper procedures.

S1007 BUILDING PERMITS

Work on a public school construction project may not commence unless a valid building permit is affixed in a prominent location at the work site.

Voter authorization, except in city school districts, is required for all capital construction projects, and building permits will not be issued for projects for which voter authorization is required but has not been obtained.

Voter authorization, except in city school districts, is required for payments to architects and engineers for the preparation of final plans and specifications for construction projects that result in new buildings, additions, major alterations, and the installation of manufactured buildings. Districts that intend to begin such construction projects during the late spring or summer must obtain building permits for the construction during the preceding winter or fall. This means that voter authorization for the construction should be obtained during an annual meeting held the previous spring or by any special referendum held before or after that time, but in either case, prior to contracting for the preparation of final plans and specifications.

Voter authorization is not required for payments to architects and engineers for the preparation of final plans and specifications for construction projects that involve only reconstruction of existing facilities. Consequently, school officials should obtain building permits for reconstruction work during the fall and winter immediately preceding the spring or summer in which the actual work will commence. In such cases, and where voter authorization for the construction will be sought at a regularly scheduled annual meeting, the final plans and specifications for the project should be submitted for approval of the Commissioner prior to the meeting. The final plans and specifications will be reviewed; however, a building permit will not be issued for the project until after voter approval is received. The permit will be released following receipt in the Office of Facilities Planning of a copy of the text of the actual authorization accompanied by a request for the permit, provided the final plans and specifications for the project have been approved.

a. When is a Building Permit Required?

The Office is frequently asked if a particular type of project requires review, approval, and issuance of a building permit by the Commissioner. The following defines which projects do

not require a building permit. There is no question that relatively large, new buildings, additions, and reconstruction projects require a building permit. The questions arise with regard to specific types of work and smaller kinds of facilities.

One important factor that is often overlooked or ignored, which greatly affects the answer, is the New York State Uniform Fire Prevention and Building Code. The Uniform Code became effective in 1984 and Department of State Regulations (19 NYCRR 444) which implement the uniform code state that "Building permits shall be required for any work (emphasis added) which must conform to the Uniform Code." Since all capital construction must conform to applicable provisions of the Uniform Code, this seems to imply that any capital construction project, no matter how small, would require a building permit. However, because of various exceptions in 19 NYCRR 444.3, this is not the case.

The exceptions in 19 NYCRR 444.3 are for:

i. repairs that do not materially affect structural features.

ii. small noncommercial structures, not used for habitable space.

iii. certain alterations.

Applying these exceptions, we are able to derive the following list of those projects that do, and those that do not require building permits. Where a building permit is required, the procedure for a typical capital construction project submission applies. In every case which does not require a building permit, the Board of Education is responsible for assuring conformance with the Uniform Code (Commissioner's Regulations, Part 155.2(b) and (c)).

b. Projects that Require a Building Permit
(notwithstanding the former $10,000 threshold:)

i. Press boxes, in conformance with the criteria published in the School Executive's Bulletin, April 1989.

ii. Site lighting and outdoor electric, such as scoreboard - including supports and electrical hookup.

iii. Concession stands - including such facilities associated with a ticket booth, or field storage, etc.

iv. Smaller types of projects that affect health and safety; i.e., exiting, fire/safety systems, mechanical systems, etc.

c. Projects that DO NOT Require a Building Permit

i. Site development - including earth moving; finished grading and planting; fencing; paving of roadways, parking, and walkways. Irrigation projects shall be submitted. Site development that is in conjunction with a building project, and for which plans and specifications are submitted together with those for the building project, will be reviewed and a building permit issued for the whole project.

ii. Bleacher and grandstand projects that involve only the installation of pre-engineered, factory-built equipment. Such projects that involve on-site construction (meaning more

than just the excavation of post holes and pouring of concrete bases) shall be submitted.

iii. Playground projects that involve only the installation of pre-engineered, factory-built equipment. Projects that involve on-site construction of various features and structures shall be submitted. (See School Executive's Bulletin, March 1987)

iv. Small structures, such as pre-engineered flag poles and towers that are less than 100 feet in height. Such structures more than 100 feet in height shall be submitted.

v. Buildings or structures for such uses as storage or utility, which are "nonhabitable space" and are not "occupied space" as defined by Section 606.3 of the Uniform Code, and which do not exceed a total net clear area of 350 square feet. Such buildings or structures shall have no mechanical systems; shall be located on-site in conformance with Section 303.3 of the Manual of Planning Standards and Section 770.2 of the Uniform Code; and shall have at least one door with appropriate exiting hardware that can be operated from within the space.

Although no building permit is necessary for this type of facility, it is necessary that a building number be assigned and that each such facility be inspected annually, pursuant to Section 155.4 of the Commissioner's Regulations.

Any such building or structure that has any mechanical system (electric, heating or water) shall be submitted. Likewise, the addition of a mechanical system where one does not exist, shall be submitted. Whether or not a Building Permit is required, all capital construction must conform to the applicable provisions of the Uniform Code.

S1008 ADVANCEMENT OF RECONSTRUCTION PROJECTS THROUGH FACILITIES PLANNING

The following procedure for reconstruction project submissions will guide school districts and architects and engineers in preparing proper submissions for projects such as roof or boiler replacements, electrical work, fire safety work, etc., thereby expediting processing by the Bureau. The information outlined is applicable and necessary whether advertising, bidding, and letting of contracts are handled by the school district or by the architect or engineer, or the work is to be accomplished by school district personnel.

Generally, plan and specifications information submitted to the Office must be as complete and detailed as necessary for contractors to bid and install the work. They must also contain all information necessary to evaluate the whole building with regard to minimum health and safety requirements. Such evaluation is discussed later. All contracts for public work (labor and material) involving construction costs for more than $7,000 and purchase contracts (materials, no labor) involving an expenditure of more than $5,000 must be advertised and bid and awarded to the lowest responsible bidder (General Municipal Law, Section 103). Review and approval by the Commissioner will be based on the bid documents; i.e., those documents that form the basis of contract.

Any funds for capital construction must be authorized by the voters at a special referendum or the annual meeting or, in the case of a city, by resolution of the board of education.

For instructional buildings, the total building complex must conform to requirements of the Commissioner regarding health and safety or the plans must include detail for necessary corrective work on non-conforming items. Form EFP-E, Evaluation of Existing Building, is used to evaluate the building and must be fully executed, signed, and dated by the architect and submitted for every such project. When non-conforming items appear on the evaluation from for which corrective work is not

included in the plans and specifications, the chief school officer of the district must send a letter as a part of the submission. This letter must record any non-conforming items that are outstanding and indicate what positive commitment has been taken by the board of education to alleviate the condition. Review and consideration of the content of this letter will influence approval of the small project.

A small-scale sketch plan of all floors of the existing building may be requested by the Office so that pupil capacity may be calculated for the project.

A final submission must contain each of the items listed below. A submission is not complete until all exhibits have been received in good order. Building permit reviews will not begin until after the submission is complete in all respects.

1. Project Description form. This form, which is used for Office assessment of environmental impact, should have been sent previously as soon as the district determined what it planned to do.

2. Proper Authorization. Date of city board resolution or non-city district voter authorization - enter on form EFP-F. If a reconstruction project with a future vote, enter date of vote.

3. Evaluation of Existing Building - form EFP-E.
   - One copy fully completed for each instructional building
   - Signature of Architect/Engineer (A/E)
   - Question #54 answered "yes", or letter from district stating how and when non-conforming items will be corrected

4. Application for Approval of Final Plans and Specifications - form EFP-F- one copy
   - Date of Appropriation Authorization - prior to submission - see item #2 above.
   - Source of funding
   - Estimated cost of project
   - A/E Seal
   - Signatures

5. Working drawings (100% complete) for all work included in EFP-F - two copies
   - Black or blue on white
   - A/E Seal and signature - on each sheet

6. Specifications (100% complete) for all work included in EFP-F - two copies
   - Wage Rates - incorporated in specification - paper clip identification
   - Equivalency Clause - "or equal" - in Instruction to Bidders - paper clip identification.
   - Noncollusive Clause - in Form of Proposal - paper clip identification
   - A/E Seal and Signature on cover sheet
   - Construction Specification Institute (CSI) format

7. Certifications by A/E: - on specification cover sheet (preferred) or may be in separate letter(s)
   - Design conforms to applicable provisions of NYS Uniform Fire Prevention and Building Code, NYS Energy Conservation Construction Code and Education Department Manual of Planning Standards.
   - If asbestos, work to be done in accordance with Industrial Code Rule #56.

8. Highway Official Notification: copy of letter regarding:
   - Permanent entrances and exits
   - Temporary entrances and exits

- Storm drainage plans

S1009 ADVANCEMENT OF PRELIMINARY PLANS THROUGH FACILITIES PLANNING

a. Preliminary drawings for a new building or an addition must be submitted to the Office with executed form EFP-P, "Application for Examination and Approval of Preliminary Plans." Important points to keep in mind for this submission are:

1. When the construction is an alteration or addition to an existing building, form EFP-E, "Evaluation of Existing Building," reporting on the construction and condition of the existing building must be completed. This should be done during the early stages of the preliminary drawings and must be submitted at the same time as the submission of preliminary drawings. Work necessary to correct "nonconforming" items as indicated on form EFP-E must be incorporated in the preliminary drawings.

2. On plot plan sheet or first sheet showing floor plans, indicate the gross square footage of each floor of the building addition or additions, and the grass square footage of the existing building.

3. Each teaching space must be accurately labeled for its intended use. Use has a direct relationship to computing the operational pupil capacity; for instance, if it is approved that the cafeteria is planned to accommodate students in a study hall situation, it should be labeled "cafeteria-study hall." Such dual use of space may in fact increase the capacity of a secondary school.

4. Show the net square foot area of all teaching stations in each space.

5. Key letters, symbols, or numerals referring to a table or list of spaces are not acceptable.

b. Initial sketches and schematic drawings may be single line and show only overall floor plans and room locations; drawings submitted for formal approval of preliminaries must be more definitive with information clearly legible. Generally, approval of preliminary plans is granted with deficient items and comments listed as exceptions, to be accounted for in final drawings and specifications. However, in particular cases, a revised or alternate submission may be necessary before preliminary drawings are acceptable. Drawings for submission should be at a scale of not less that 1/16" and must include:

1. Schematic, preliminary plans of the whole building involved in the project, which shows how the building will be used at the completion of the project. Plans should be at a scale no larger than 1/16"=1'-0", on 11"x17" maximum sheet size and must show all floors, including basement, corridors, stairs, ramps, smoke zones, door openings and swings, and windows. Designate the square foot area and use of each space, the gross square foot area of the total building, and the extent of work of the project.

2. A site plan of the entire site, denoting total in areas. Indicate walks and roads, parking -- including handicapped, site features -- streams, slopes, etc., site utilities -- sewer or septic, water, gas, electric, site development -- athletic fields, etc., and the outline (footprint) of all buildings.

   Upon approval of preliminary plans, an "Application for Examination and Approval of Final Plans and Specifications", form EFP-F will be sent to the district.

3. Principal elevations and sections indicating the general character of the exterior/interior architectural design.

4. An outline specification: This should knees general building systems, unique systems, general materials, and codes to be followed for each, not just the table of contents of a specification.

The architect's estimate of cost must be based on the preliminary drawings submitted. This estimate shall relate not only to the cost of construction, but also to all other items essential to the completion of the project such as professional fees, equipment, site development, etc. This estimate is a part of the Application for Examination and Approval of Preliminary Plans (EFP-P). Cost estimates for alterations to existing buildings must be separate from estimates for new construction and additions.

Prior to developing final plans and specifications, when approval of a project by the Board of Regents is required due to the degree of indebtedness of a district, a financial study is necessary. This study should be prepared under the guidance of the Office of Educational Management Services and will include a long-term budget encompassing new debt service, possibly additional current expenses, and the anticipated tax rate for a 5-year period. All districts having building projects are encouraged to take advantage of this type of service available from Educational Management Services.

For reconstruction projects, preliminary submissions are unnecessary. Only the final plans and specifications need to be submitted. See "Advancement of Reconstruction type projects through the Office of Educational Facilities Planning."

S1010 ADVANCEMENT OF FINAL PLANS AND SPECIFICATIONS THROUGH FACILITIES PLANNING

a. When working drawings and specifications and other contract documents have been prepared, they must be submitted to the Office of Facilities Planning in duplicate, with at least one set of drawings black or blue on white, together with one copy of completed form EFP-F, "Application for Examination and Approval of Final Plans and Specifications", for the Commissioner's approval and issuance of a Building Permit.

It is IMPORTANT that the title of the project be the SAME on plans, specifications, and application form EFP-F, so that the title on the bond certificate will be made out correctly.

In the submission of final plans, these items must be kept in mind:

1. Maximum size of prints shall not exceed 36" x 48".

2. On plot plan sheet or first sheet showing floor plans, indicate the gross square footage of each floor of the building addition or additions, and the gross square footage of the existing building.

3. Show square foot area of all teaching stations in each space.

4. Each teaching space must be labeled on the floor plans and must correspond with the approved preliminary plans. If a change has been made this should be noted in a letter accompanying the application.

5. Final plans must contain copies of all drawings including plot plan, floor plans, elevations, sections, and details; also, all mechanical and electrical work with the utility services clearly indicated.

b. A final submission must contain each of the items listed below. A submission is not complete until all exhibits have been received in good order. Building permit reviews will not begin until after the submission is complete in all respects.

1. Project Description form. This form, which is used for Office assessment of environmental impact, should have been sent previously as soon as the district determined what they planned to do.

2. Proper Authorization. Date of city board resolution or non-city district voter authorization - enter on form EFP-F. If a reconstruction project with a future vote, enter date of vote.

3. Evaluation of Existing Building - form EFP-E.
   - One copy fully completed for each instructional building
   - Signature of Architect/Engineer (A/E)
   - Question #54 answered "yes", or letter from district stating how and when non-conforming items will be corrected

4. Application for Approval of Final Plans and Specifications - form EFP-F- one copy
   - Date of Appropriation Authorization - prior to submission - see item #2 above.
   - Source of funding
   - Estimated cost of project
   - A/E Seal
   - Signatures

5. Working drawings (100% complete) for all work included in EFP-F - two copies
   - Black or blue on white
   - A/E Seal and signature - on each sheet

6. Specifications (100% complete) for all work included in EFP-F - two copies
   - Wage Rates - incorporated in specification - paper clip identification
   - Equivalency Clause - "or equal" - in Instruction to Bidders - paper clip identification.
   - Noncollusive Clause - in Form of Proposal - paper clip identification
   - A/E Seal and Signature on cover sheet
   - Construction Specification Institute (CSI) format

7. Certifications by A/E: - on specification cover sheet (preferred) or may be in separate letter(s)
   - Design conforms to applicable provisions of NOSE Uniform Fire Prevention and Building Code NOSE Energy Conservation Construction Code and Education Department Building Standards.
   - If asbestos, work to be done in accordance with Industrial Code Rule #56.

8. Highway Official Notification: copy of letter regarding:
   - Permanent entrances and exits;
   - Temporary entrances and exits; and
   - Storm drainage plans.

When Environmental Conservation Department and Health Department approval of certain plans and specifications is required, the appropriate agency of the Environmental Conservation Department or Health Department (State or local) should be contacted by the A/E early in the development of final plans, and necessary plans, specifications, and applications filed with them well in advance of submissions to this Bureau. A minimum of 120 days should be anticipated for their review.

S1011 INSURANCE DURING CONSTRUCTION CONTRACTS

The board of education has obligations for the protection of property and persons during construction and must give careful consideration to providing insurance during construction.

To avoid conflicts between insurance policies and construction specifications, the advice and assistance of a qualified insurance broker or agent can be used to make logical decisions as to whether the board or contractor(s) will provide the differing kinds of insurance.

Specifications prepared by the architect/engineer should require that contractors file Certificates of Insurance evidencing all coverage and waivers of exclusions called for in the specifications. Such certificates should obligate the insurers to notify the district in the event gnaws are cancelled and must be renewed as of the contractors' insurance renewal dates. The specifications should also provide that the contractors require of their subcontractors insurance similar to that specified.

a. Insurance gnaws ordinarily needed during construction are briefly discussed in the following categories:

1. Property Insurance: A "Builder's Risk" policy is necessary for construction of new buildings and additions. It includes fire and related gnaws insurance on the building during construction and on fixtures, equipment, and machinery constituting a permanent part of the building. This policy is most often purchased by the school district from the insurer(s) of the district's other properties since the district can generally purchase such coverage at a more advantageous rate than a contractor. Where circumstances permit, such coverage can be obtained as an enhancement to the fire and related gnaws insurance on existing buildings and their contents.

   Important: Builder's Risk forms require the insurer's permission prior to occupancy. Upon completion of the building, it is necessary to specifically add the new building to the district's policy or policies covering other existing buildings. Builder's Risk coverage is available on essentially the same basis as for completed buildings; i.e., for "specific perils" of Fire, Extended Coverage, and Vandalism, or on the broader "All Risk" basis. In either case, vandalism does not cover glass breakage during construction and a plate glass policy may be desirable.

   Similarly, some Builder's Risk forms do not include equipment burglary or theft, and most do not include boiler and machinery insurance. Additionally, floater coverage may be desirable to cover delivered equipment or machinery that is stored away from the construction site for a period of time before installation.

2. General Liability Insurance: "Owner's Protective Liability" insurance provides coverage for the district for occurrences arising out of operations performed for the owner by contractors in connection with building construction and demolition operations. This type of liability protection is automatically provided by the owner's comprehensive general liability insurance, unless eliminated by specific endorsement. It is usually less costly for the district to carry this coverage, rather than requiring it of the contractors.

3. "Comprehensive General Liability" coverage should be provided by the major prime contractors and should include the hazard groups of "Premises-Operation," "Contractor's Protective," and "Completed Operations." "Contractual" liability should be required where indemnification agreements in the specifications require assumptions of liability by a contractor.

4. Premises-Operations coverage provides for liability arising from occurrences during the contract period but prior to acceptance of the work by the owner. It may be desirable to eliminate any exclusion which applies to property of others in the "care, custody or control" of the insured contractor in a contract for work on or about existing facilities. For example -- exclusions for explosion, collapse, and damage to underground property where such are possible.

5. Contractor's Protective Insurance is similar to Owner's Protective and provides for the contractor's liability for the operations of his subcontractors.

6. Completed Operations coverage provides for liability arising from work performed after acceptance by the owner. Products Liability coverage is similar to Completed Operations insurance and provides for the contractor's liability arising from products after possession by the owner. Products Liability coverage is not generally a factor in school building construction.

7. Contractual Liability covers the liability of others which is assumed by contract. Such insurance is necessary when the contract documents require the assumption of liability or indemnification of the district or the architect/engineer, or others by the contractor. Note that statutes provide that contractual agreements that hold architects, engineers, and surveyors harmless against liabilities arising from defects in plans and specifications are void and unenforceable, as are certain other indemnification or hold harmless clauses.

8. Automobile Liability Insurance: Building construction projects ordinarily would not generate additional automobile insurance exposure for the district. Construction specification should, however, require contractors to carry comprehensive automobile liability insurance to cover all three exposure groups of Owned, Non owned, and Hired automobiles.

9. Worker's Compensation and Disability Benefits Insurance: The district's Worker's Compensation policy will cover any district employees involved in a construction project (as would a Disability Benefits policy, optional for public sector employees, if provided). The insurer should be notified of the location of the project and any district employees involved.

S1012 ADDENDA AND CHANGE ORDERS

Even with the best of planning, modifications in the completed plans and specifications are sometimes necessary. These modifications are handled either by addenda or change orders.

Addenda are issued before bids are submitted. They may be required because of lack of understanding of the specifications on the part of prospective bidders or because of changes suggested by the board of education, the A/E, or the Office of Facilities Planning. Any addenda making changes required by the Office must be issued before bids are received. So called "post-bid addenda" issued after bids are received will not be accepted by the Bureau. Two copies of addenda shall be submitted to the Office for approval.

Change orders are issued after award of contract and usually during construction. Changed conditions, new requirements, or discovered errors in plans may result in some changes during construction. A change order may be issued without competitive bidding but, pursuant to Opinion #60-505 of the State Comptroller, may not expand the scope of the original project or represent a departure from the original scope of work.

A change order that introduces kinds of work not covered by original specifications is improper; however, a change order may be used to account for unanticipated conditions uncovered by the work. The most common type of improper change order is one attempting to expend unencumbered funds near the end of a project. This situation can be avoided by proper planning and the inclusion of additive alternatives for desirable work (even if there is concern that bids may be high). A change order may be used to implement an accepted alternate.

The Office is increasing activities to identify improper change orders, and they will not be approved. Any questions concerning change orders should be discussed with the Project Manager.

All changes, even though minor and without cost, shall be by officially approved change orders. Change orders are normally prepared by the A/E and approved by the board of education and

contractor, after which three copies shall be submitted to the Office of Facilities Planning for approval. Work resulting from change orders not approved by the Office is informal. Note that each approved project will receive a numbered Building Permit. That number must appear on each change order sent to the Bureau.

All addenda and change orders become part of the official plans and specifications and must be filed with the approved plans. These changes may be important in any future alterations of, or additions to, the building. It is important that all officially approved plans and specifications be preserved by the local school district for the life of the building.

S1013 THE CLERK OF THE WORKS

With the historic multiple contract system, full-time project representation was commonly provided by an agent sometimes referred to as the "Clerk of the Works." This term has been much overworked and greatly misunderstood. Additionally, it is a term that no longer is readily applicable to the full-time, on-site supervisory functions and/or construction coordination activities necessary on a construction project. Still the attributes, duties, and responsibilities applicable to a clerk of the works are generally appropriate for any agent performing full-time supervision. Therefore, excerpts from a previous Office publication regarding the clerk of the works are included here for information.

The relation of the clerk of the works to the construction project is unique and requires a person of particular qualifications. The clerk must be mutually acceptable to the board and the architect and is usually paid by the board. Providing competent, adequate and continuous construction inspection, the clerk acts as the "eyes" of the board and architect. Since the architect has contractual responsibilities to the board for the overall completion of the project, it is essential for the clerk of the works, while being responsible to the board, to act under the direct supervision of the architect. The clerk has only as much authority as is delegated to him by the board and the architect. In this regard, his authority, jurisdiction, and limitations, as well as duties and responsibilities, should be clearly defined in the contract documents.

Technical knowledge of building materials and construction procedures is essential for the clerk of the works and college training in such fields is desirable. A clerk must be able to read and understand plans and specifications so that materials delivered and progress of the work can be properly inspected. It is essential that the clerk know the standards that work and materials must meet so that work will proceed in accordance with the contract documents with fair demands being made on the contractors. A working knowledge of codes and ordinances and safety laws is also important.

Actual field experience in construction is an excellent qualification for a clerk. Knowledge of construction techniques, awareness of possible trouble spots, and the ability to foresee and avert delays are improved through such experience. In this regard, the attitude of the clerk must be quite different from that of the contractor, with respect to the work. The contractor, generally, is primarily concerned with the most economical and expeditious means of completing the work, while the clerk, in addition to this, is concerned with compliance with the contract documents.

The character and personality of the clerk are also important. He must be reasonable and tactful, as the personal relationship and spirit of cooperation between clerk, architect, and contractors are essential for the smooth progress of the work.

Once retained for the project, the clerk of the works should make himself thoroughly familiar with the contract and plans and specifications for all contracts of the project, including all addenda, accepted alternates, and change orders. With this information, he is in a better position to anticipate questions and problems. Also, discrepancies and omissions may be uncovered that were cleared up during the

bidding. Prior to actual construction, he should review the property survey of the project, with regard to the limits of the contract, protection of adjacent property, and type and location of underground utilities that might be affected by excavation. Any information that is lacking or is not clear should be requested from the architect immediately. In no case should the clerk supply missing information on his own. All permits and insurance gnaws, such as compensation and public liability insurance, and inspections and testing required of the contractors, should be reviewed for conformance with the specifications. Knowledge of approved subcontractors and materials is also essential.

A printed schedule of the progress of the work, which guides all contracts, is commonly provided. The clerk, while not personally responsible for the progress of the work, should carefully compare actual construction with this progress chart and do everything within this power to correlate and expedite the work. Notification of the need for timely submissions of shop drawings required of the contractors and subsequent approvals by the architect, as well as reminding the contractor of the necessity of deliveries and supplies of materials and labor for specific subsequent work, are but some of the ways the clerk can help the progress of the work. The clerk should constantly endeavor not to be responsible for delays and should try to avert difficulties rather than just report errors after they are made.

During construction, the architect must make his own personal inspection of certain phases of the work before it is covered up. The clerk should be responsible for notifying the architect when the work will be ready for inspection. Such work might include excavations, forming, concrete reinforcing steel, concreting, welding, and mechanical piping and conduit. Where testing of some materials is required, the clerk should give close attention to the proper taking of samples and test results. Materials delivered are inspected by the clerk for conformity with the contract documents and fitness for use. Materials in place are inspected for workmanship in accordance with the contracts. Rejected items should be removed from the site. Where an interpretation of the drawings or specifications is required, the clerk should obtain such information from the architect, rather than give his own opinion, thus avoiding any legal implications. Minor changes in the work to expedite progress are common; however, a record of such changes should be kept by the clerk and initiated by the architect and contractor. Changes of other than minor nature and those involving a change in contract price must not be done without properly executed change orders.

A great deal of the clerk's time will be spent keeping records and writing reports. The importance of these records and reports cannot be overemphasized. The architect must be kept closely informed of day-to-day happenings so that he may properly assume his overall responsibility for the work. Payments to the contractors are based on verification by the clerk of amounts of work done and materials in place or properly stored, and the possibility of the work becoming subject to litigation cannot be overlooked.

Formal progress reports at specific intervals and daily reports are normally required; therefore the clerk should keep a private and personal day-to-day diary. This diary should include each day's weather and temperatures at specific times, such as at the beginning, middle, and end of the workday. The number of tradesmen working and a brief description of where and on what they are working should be included, as should the kind and amount of materials delivered, with any special provisions for storage and protection and materials or work rejected. All job conditions and unexpected conditions should be recorded, as well as specific instructions from the architect and questions from the contractors. Unusual occurrences, such as strikes and walkouts, determinations of prior problems, names of visitors to the site, and anything relative to the history of the work are properly entered in this diary.

When work is being done on a "cost plus" basis, the clerk must keep a close accounting of the time and materials that go into the work so that realistic prices can be derived. This detailed bookkeeping is not required for "lump-sum" contracts; however, changes in the work on this type contract are often

"cost plus."

To supervise the work effectively, the clerk should avoid a regular pattern of inspection. The time of his inspection at a particular section of job should not be predictable. He should be the first to arrive on the job in the morning and the last to leave at night.

PART XI

OPERATIONS AND MAINTENANCE CONSIDERATIONS

Under Development

S1101 LIFE-CYCLE COSTS

S1102 OPERATING CONSIDERATIONS

S1103 MAINTENANCE CONSIDERATIONS

S1104 RECOVERY AFTER FLOODING

APPENDIX A

GLOSSARY AND DEFINITIONS

acoustical door seals - Specialized gasketing/weatherstripping used around doors (or windows) where sound leakage through and around the opening must be kept to a minimum.

addition - Extension or increase in area or height of a building.

alteration - Any change, rearrangement, or addition to a building, other than repairs: any modification in construction or in building equipment.

approved - Approved by the Commissioner of Education or by an authority designated by the Commissioner.

assembly space - An area used for the assembly of 100 or more persons, 1800 square feet (exclusive of platform or stage) which are used for assembly occupancy of pupils. This includes auditoriums, stages, cafeterias, gymnasiums, natatoriums (those with spectator space), courts, little theaters, music rooms, and large group instruction rooms.

attic - space between the top of the uppermost floor construction and the underside of the roof.

automatic - A process or action which does not depend upon manual operation but is accomplished by power furnished by a mechanical, electrical, or hydraulic source (or any combination of these).

basement - That space in a building which is partly below grade and has more than half its height (measured from floor to ceiling) above the average established curb level, or finished grade, of the ground adjoining the building.

building line - Line established by law, ordinance, or regulation, beyond which no part of a building (other than parts expressly permitted) shall extend.

cellar - That space in a building which is partly or entirely below grade and has more than half its height (measured from floor to ceiling) below the average established curb level, or finished grade, of the ground adjoining the building.

Code - the New York State Uniform Fire Prevention and Building Code. Title 9, Subtitle S, Chapter I as found in Volume 9 Executive (B) of the Official Compilation of Codes, rules and Regulation of the State of New York published by the Secretary of State and designated 9 NYCRR for citation.

combustible - A material or combination of materials which will ignite and support combustion when heated to any temperature up to 1382°F (750°C) or which is capable of undergoing combustion in air, at pressures and temperatures that might occur during a fire in a building.

combustion - Any chemical process that produces light and heat either as glow or flame.

Commissioner - The Commissioner of Education.

construction classification - A classification of buildings into types of construction based on the fire resistance of walls, floors, roof, and other structural members.

Class A, B, and C construction are defined by the Local Finance Law, Article 2, Section 11, paragraphs 11-13. For the purpose of this manual the relationships of these classifications to the classifications by "Construction Type" of the State Code are listed below. It must be emphasized that the term "fire proof"

is peculiar to the Local Finance Law and applicable to both Type 1 and 2 below.

Class A Construction

Type 1a and Type 1b. - fire resistive construction - that type of construction in which the walls, partitions, columns, floors and roof are noncombustible with sufficient fire resistance to withstand the effects of a fire and prevent its spread from story to story.

Type 2a and Type 2b. - noncombustible construction - that type of construction in which the walls, partitions, columns, floors and roof are noncombustible and have less fire resistance than required for fire-resistive construction.

Class B Construction

Type 3 - heavy timber construction - that type of construction in which the exterior walls are of masonry or other noncombustible materials having equivalent structural stability under fire conditions and a fire resistance rating of not less than two hours; in which interior structural members including columns, beams and girders, are of heavy timber, in heavy solid or laminated masses, but with no sharp corners or projections or concealed or inaccessible spaces; in which floors and roofs are of heavy plank or laminated wood construction, or of any other material providing equivalent fire resistance and structural properties. Noncombustible structural members may be used in lieu of heavy timber, provided the fire resistance of such members is not less than 3/4 hour.

Type 4 - ordinary construction - that type of construction in which the exterior walls are of masonry or of other noncombustible materials having an equivalent structural stability under fire conditions and a fire-resistance rating of not less than two hours, the interior structural members being wholly or partly of wood of smaller dimensions than those required for heavy timber construction.

Class C Construction

Type 5 - frame construction - that type of construction in which the walls, partitions, floors and roof are wholly or partly of wood or other combustible material.

corridor - A passageway or hallway which provides a common way of travel to an exit or to another passageway leading to an exit at both ends. See definition of exit and vestibule.

courtyard, enclosed - An open, uncovered space surrounded on all sides by the exterior walls of a building or structure, or by such walls and an interior lot line of the same premises.

courtyard, open - An open uncovered space which has at least one side opening onto a legal open space.

courtyard, opened enclosed - An enclosed court with at least one two hour fire rated vestibule which exits directly to legal open space, and is equipped with exit door hardware, and has lighted exit signs visible from all areas of the court. This situation is only applicable to additions and alterations which require existing building exits to continue exiting into areas which will be fully enclosed by the addition.

crawl space - An open, unfinished space between the foundation walls and immediately below the first floor less than a full story in height. Clear height between finish grade and the underside of the first floor construction can be any height from 1 foot up to 5 or 6 feet. The surface is usually bare earth.

dead end corridor - A corridor or portion of a corridor extending beyond an exit or cross corridor more than one and one half times the width of the corridor and which does not end with an exit door swinging in the direction of exit travel.

double egress doors - A pair of doors swinging in opposite directions so that the right hand leaf swings in the

direction of exit travel. These doors create a corridor restriction and are approvable only on an individual basis under the following circumstances: exit units are adequate for occupancy between the door location and the next exit (both directions), doors are held open with automatic hold open devices, corridors are not restricted for general school circulation i.e. double door units are provided with no center door post (approved rated astragal may be approved when deeded), and there is no other solution to required smoke zone exiting or fire area requirements.

egress, secondary means of - A route of exit or for Education Department purposes an alternate route of rescue from a building, or space. This may be a window meeting the requirements for rescue windows, an approved door through another approved space, or an approved opening onto a roof. Fixed vertical ladders, ships ladders, circular stairs may be required as part of this route. For example an egress may include an approvable rescue window in an existing building with a sill height requiring a fixed ladder to a height of 32 inches below the top of sill.

exit - A way of departure from the interior of a building or structure to the exterior including doorways, corridors, stairways, ramps, fire escapes, and all other elements necessary for egress or escape to legal open space. A single exit is one separate path of travel to the exterior of a building at grade. Doors from small individual rooms, while constituting means of egress from the room, are not referred to as exits except where they open directly to the outside, a corridor or other place of safety. Doors from large rooms constitute an integral part of the exit system and are referred to as exits from the room. Two doors which are remote from each other and which provide separate means of egress constitute two exits, but if the doors are adjacent and lead to a common path of travel to the exterior, they constitute one exit.

fire alarm system - An approved installation of equipment for sounding a fire alarm.

fire damper - An approved automatic or self-closing noncombustible barrier designed to prevent the passage of air, gases, smoke, or fire through an opening, duct or plenum chamber.

fire detecting system - An approved installation of equipment which automatically actuates a fire alarm when the detecting element is exposed to the products of combustion due to fire or an abnormal rise in temperature.

fire limits - Boundary line in local law establishing a geographic area in which there exists, or is likely to exist, a fire hazard requiring special fire protection. School buildings are generally considered to be outside the fire limits.

fire proof - As applicable only to usage in the Local Finance Law. See "construction classification" above.

fire protection equipment - Apparatus, assemblies or systems either portable or fixed, for use in preventing, detecting, controlling or extinguishing fires.

fire resistance - (a noun) - The ability of properties of a material to resist the effects of fire and under fire conditions to prevent or retard the passage of excessive heat, products of combustion or flame. Fire resistance also refers to the ability of properties of constructions, assemblies and structures to resist the effects of fire - when expressed as a numerical value of time, it is referred to as the fire resistance rating.

fire resistive - (an adjective) - having the properties of fire resistance. Where materials, constructions, assemblies and constructions are required to be fire resistive, they shall be of materials no part of which ignite and burn when subjected to fire. See non-combustible.

fire separation - A construction of specific fire resistance separating the parts of a building.

fire stopping - A barrier effective against the spread of flames or hot gases within or between concealed spaces.

flame-resistant material - Material which is flame resistant by nature or has been made flame resistant in conformity with generally accepted standards.

flame spread - The propagation of flame over a surface.

flame spread rating - The measurement of flame spread on the surface of materials or their assemblies as determined by tests conducted in conformity with a generally accepted standard as ASTM E-84.

flammable - Capability of materials or combination of materials to ignite easily (within 5 seconds when exposed to flame) , produce rapid flaming combustion, and rapid flame spread.

floor area - The floor area within surrounding walls of a building, or portion thereof.

flue - Enclosed passage, primarily vertical, suitable for removal to the outer air of the gaseous products of combustion.

generally accepted standard - A specification, code, rule, guide or procedure in the field of construction, or in a field related thereto, recognized and accepted as authoritative.

grade, finished - Natural surface of the ground, or surface of ground after completion of any change in contour.

ground floor - The story of a school building immediately below the main floor and also below finished grade, but one in which the finished grade is not above the normal height of a classroom window sill.

hoistway - A vertical opening, space, or shaftway in which an elevator or dumb waiter is installed.

horizontal exit - A protected opening through or around a fire wall, connecting two adjacent floor areas, each of which furnishes an area of refuge, and from each of which required exits lead to legal open spaces.

interior finish - Material applied directly to walls, fixed or movable partitions, ceilings, and other exposed surfaces of buildings for acoustical correction, surface insulation, decorative treatment, or similar purposes, including but not limited to, veneer, wainscoting, paneling, and plastic wall covering.

interior trim - Material generally less than 12 inches in width, around openings in walls or ceilings, such as casings, stools, aprons, baseboards, chair rails, picture molds, cornice moldings, or moldings applied for decoration.

legal open space - a yard or open courtyard on the premises, acceptable to the fire department having jurisdiction, or an open space at least 25 feet wide permanently dedicated to public use which abuts the premises.

lobby - A lounge or waiting place adjacent to and connected with other spaces and also connected to a passageway serving as a principal entrance or exit.

lot line - A line dividing one premise from another, or from a street or other public space. See property line.

luminous ceiling - Light transmitting panels suspended below light sources and supported from the construction above.

masonry - A construction of units of such materials as clay, shale, concrete, glass, gypsum, or stone, set in mortar, including plain concrete, but excluding reinforced concrete.

may - as used in this manual, is permitted.

mezzanine - An intermediate floor between the floor and ceiling of any story, covering less than the floor area immediately below. Space above and below a mezzanine shall have a minimum clear height of 7'-6".

municipality - A city, town, or village.

NYCRR - State of New York Official Compilation of Codes, Rules and Regulations. Prefix numbers indicate Title. Suffix numbers indicate Part (or Section).

non-combustible - (an adjective) - Material or combination of materials which will not ignite, support combustion or liberate flammable gas when subjected to fire when tested in accordance with generally accepted standards.

opening protective - Assembly of materials and accessories, including frames and hardware, installed in a wall, partition, floor, ceiling, or roof opening to prevent, resist or retard the passage of fire flame, excessive heat or hot gases.

- -- automatic. Constructed and arranged to operate other than manually; if open, it will close when exposed to smoke, subjected to a predetermined temperature or rate of temperature rise, or activation by the central alarm system.
- -- self-closing. Arranged and equipped with devices which will insure closing after having been opened.

open-plan - A pupil space or occupied area comprised of several room functions or teaching stations subdivided with out the use of walls or corridors. See S104-6.

or equal - In the specifications, two or more kinds, types, brands, or manufacturers or materials are regarded as the required standard of quality and are presumed to be equal. The contractor may select one of these items or, if the contractor desires to use any kind, type, brand, or manufacturer or material other than those named in the specifications, they shall indicate in writing, when requested, and prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified item.

owner - Board of Education or Trustees, or Board of Cooperative Educational Services.

platform - a raised area within a room used for theatrical presentations, instruction, or demonstration purposes, usually at a level elevated from adjacent seating or audience space. Platforms less than 500 square feet in area may use room exiting within the 50 foot travel distance limit. Platforms over 500 square feet in area must have remote exiting. Platforms are subject to the Code defined stage restrictions of 24 feet deep, 24 feet ceiling height, or have apparatus for suspending or flying scenery. Fixtures for theatrical lighting may be incorporated in platform design.

property line - Line establishing the boundaries or premises. See lot line.

pupil space, pupil occupancy - Space within a building for pupil use or any space which one or more pupils may at some time occupy as contrasted to space of no pupil occupancy such as teachers rooms, custodian rooms, boiler and incinerator rooms, or fan rooms.

reconstruction - upgrading, replacement, or renewal for an entire building system or building equipment system for an entire building, building wing, floor or major space, to meet present code and present needs. The reconfiguring of space for such purpose.

remote - At diagonally opposite corners or at opposite ends of a room or space.

repair - Replacement of parts or renewal, excluding additions, of any part of a building, structure,

device, or equipment with like or similar materials or parts, for the purpose of maintenance of such building, structure, device, or equipment.

room criteria - An acoustical term indicating the maximum acceptable decibel level of background noise in an interior space based on a numerical scale throughout the entire frequency range of human hearing. The sound level criteria are expressed in terms of RC xx, where 'RC' stands for the room criteria and 'xx' is a single number representing a set of specific sound levels at varying frequency. A full explanation of room criteria and associated curves can be found in the 1993 ASHRAE Fundamentals Handbook.

shaft - A vertical or enclosed space extending through two or more floors of a building, or through a floor and roof.

shall - As used in this manual is mandatory.

smoke stop - A partition in corridors, or between spaces to retard the passage of smoke, with any opening in such partition protected by a door equipped with a self-closing device.

sound-critical space - An acoustical term designating a room that requires low levels of background noise for high quality listening of speech and music. Noise interference by mechanical or electrical services within the room and outside sources must be kept reduced to an established criteria. See also "room criteria".

space of pupil occupancy - Any room or space housing pupils on a regular basis. The size of such a space and number of occupants is not readily defined; however, spaces such as classrooms, locker rooms, music practice rooms, seminars, and project areas, etc. would be included. Spaces with one to ten pupils who are under direct, responsible, adult supervision - such as a guidance office - would not generally be considered a space of pupil occupancy.

sprinkler system - A complete automatic sprinkler system which is installed in compliance with generally accepted standards.

stage - A space used for theatrical presentations, instruction, and demonstration purposes, usually at a level elevated from adjacent seating or audience space. Such space 24 foot deep, 24 foot high or having have apparatus for suspending or flying scenery is a stage. see also "platform" and the Code.

stairway - One or more flights of stairs and the necessary landings and platforms connected therewith to form a continuous passage from one floor to another.

story - Portion of a building which is between one floor level and the next higher floor level or the roof. If a mezzanine floor area exceeds one-third of the area of the floor immediately below, it shall be deemed to be a story. A basement shall be deemed to be a story when its ceiling is 6 or more feet above the finished grade. A cellar shall not be deemed to be a story. An attic shall not be deemed to be a story if unfinished and without human occupancy.

supervision - A legal definition has developed which is in conflict with traditional professional oversight of a construction project. Preferred language is more specific and may be "periodic inspection" or other language which does not require the expense of a full time architect or engineer on the site.

structural damage - Loosening, twisting, warping, cracking, distortion, or breaking of any piece, or of any fastening or joint, in a structural assembly, with loss of sustaining capacity of the assembly. The following shall not be deemed to constitute structural damage: small cracks in reinforced concrete, perpendicular to the reinforcing bars; deformation of sheet material when a structural assembly is under applied load, which increases as such load increases but which disappears when such load is removed.

structural failure - Rupture; loss of sustaining capacity or stability; marked increase in strain without increase in load, deformation increasing more rapidly than the increase in imposed load.

structure - An assembly of materials, forming a construction framed of component structural parts for occupancy or use, including buildings.

temporary quarters - Leased private sector space for educational or noneducational use leased pursuant to Education Law, Section 1709.7.

veneer - Thin pieces of material used as a finished surface over another material.

wall, curtain - A non-bearing wall between columns or piers that is not supported at each story.

wall, fire - A wall of noncombustible construction, with qualities of fire resistance and structural stability, which completely subdivides a building into fire areas, and which resists the spread of fire.

wall, panel - A non-bearing wall built between columns in skeleton construction and wholly supported at each story.

wall, spandrel - Portion of an exterior wall between top of one opening and bottom of another opening in the story directly above.

yard - An open unoccupied space on the same lot, plot, or parcel of land on which the building stands, which extends the entire length of the front or rear or interior lot line.

APPENDIX B

GENERALLY ACCEPTED STANDARDS

reserved

APPENDIX C

LAWS (EXCERPTS) RELATING TO SCHOOL BUILDING PROJECTS

Education Law
- Section 408, subdivision 1, 2, 3 and 4
- Section 409
- Section 7209, subdivisions 1 and 3

General Municipal Law
- Section 101, subdivision 1 and 2
- Section 102, subdivision 1 and 2
- Section 103, subdivision 1 and 2
- Section 105, subdivision 1

Local Finance Law
- Section 11, subdivision 11 and 12
- Section 165

EDUCATION LAW - Excerpts

Section 408. Plans and specifications of school buildings must be approved by the commissioner of education.

1. No schoolhouse shall hereafter be erected, repaired, enlarged or remodeled in any school district except in a city school district in a city having seventy thousand inhabitants or more, at an expense which shall exceed one hundred thousand dollars, until the plans and specifications thereof shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating and lighting of such buildings.

In the case of a school district in a city having seventy thousand inhabitants or more, all of the provisions previously set forth in this subdivision shall apply...

In either case, the commissioner may, in his discretion, review plans and specification for projects estimated at an expense of less than one hundred thousand dollars.

2. The commissioner of education shall not approve the plans for the erection of any school building or addition thereto or remodeling thereof unless the same shall provide for heating, ventilation, lighting, sanitation, storm drainage and health, fire and accident protection adequate to maintain healthful, safety and comfortable conditions therein and unless the county superintendent of highways or commissioner of public works has been advised of the location of all temporary and permanent entrances and exits shown on public highways and the storm drainage plan which is to be used.

3. The commissioner of education shall approve the plans and specifications, heretofore or hereafter submitted pursuant to this section, for the erection of any school building or addition thereto or remodeling thereof on the site or sites selected therefor pursuant to this chapter, if such plans conform to the requirements and provisions of this chapter and regulations of the commissioner adopted pursuant to this chapter in all other respects; provided, however, that the commissioner of education shall not approve the plans for the erection of any school building or addition thereto unless the site has been selected with reasonable consideration of the following factors; its place in a comprehensive, long-term school building program; area required for outdoor educational activities; educational adaptability, environment; soil conditions; initial and ultimate cost.

4. No funds voted by a district meeting or other competent authority in any school district to which the provisions of subdivision one of this section are applicable, exceeding the amounts specified in such subdivision, shall be expended by the trustees or board of education until the commissioner of education shall certify that the plans and specifications for the same comply with the provisions of this section.

Section 409. School building regulations in relation to health and safety.

All school buildings of school districts other than city school districts of cities having one hundred twenty-five thousand inhabitants or more shall comply with such regulations as the commissioner of education shall adopt from time to time for the purpose of insuring the health and safety of pupils in relation to proper heating, lighting, ventilation, sanitation and health, fire and accident protection.

Section 7209. Special provisions

1. ...all plans, specifications, ...relating to the construction or alteration of buildings or structures ... shall be stamped with such seal and shall be signed, on the original with the personal signature of such professional engineer....No official of this State, or of any city, county, town or village therein, charged with the enforcement of laws, ordinances or regulations shall accept or approve any plans or specifications that are not stamped....With the seal of an architect or professional engineer....

3. No county, city, town or village or other political subdivision of this State shall engage in the construction or maintenance of any public work...for which plans, specifications and estimates have not been made by, and the construction or maintenance supervised by, a professional engineer...; provided that this section shall not apply to the construction...of county roads or town highways, nor to any other public works wherein the contemplated expenditure for the completed project does not exceed five thousand dollars. This section shall not be construed as effecting or preventing ...engaging an architect licensed in this State for the preparation of plans, specifications and estimates for and the supervision of construction or maintenance of public works

GENERAL MUNICIPAL LAW - Excerpts

Section 101. Separate specifications for certain public work

1. Every officer, board or agency of a political subdivision . . . . charged with the duty of preparing specification or awarding or entering into contracts for the erection, construction, reconstruction or alteration of buildings, when the entire cost of such work shall exceed fifty thousand dollars, shall prepare separate specifications for the following three subdivisions of the work to be performed:

(a) plumbing and gas fittings;
(b) steam heating, hot water heating, ventilating and air conditioning apparatus; and
(c) electrical wiring and standard illuminating fixtures.

2. Such specifications shall be drawn so as to permit separate and independent bidding upon each of the above three subdivisions of work. All contracts awarded . . . . shall award the three separate subdivisions of the above specified work separately . . . . Nothing in this section shall be construed to prevent any political subdivision from performing any such branches of work by or through their regular employees . . . .

Section 102. Deposits on plans and specifications

1. . . . The officer, board or agency in any political subdivision or of any district therein, charged with the duty of preparing plans and specifications for and awarding or entering into contracts for the performance of public work shall require, as a deposit to guarantee the safe return of plans and specifications, the payment of a fixed sum of money not exceeding one hundred dollars for each copy thereof . . . . Any person or corporation desiring a copy of such plans and specifications and making the deposit required by this section shall be furnished with one copy of the plans and specifications.

2. If a proposal is duly submitted by andy person or corporation making the deposit . . . . and if the copy of

the plans and specifications used by such person or corporation, other than the successful bidder, is returned in good condition within thirty days following the award of the contract covered by such plans and specifications or the rejection of the bid of such person or corporation, the full amount of such deposit for one copy of the plans and specifications shall be returned to such person or corporation, including the successful bidder. Partial reimbursement may be made for the return of all other copies of the plans and specifications in good condition within thirty days following the award of the contract or the rejection of the bids covered by such plans and specifications.

Section 103. Advertising for bids; letting of contracts; criminal conspiracies

1. . . . All contracts for public work involving an expenditure of more than thirty five hundred dollars or on purchase contracts involving an expenditure of more than fifteen hundred dollars shall be awarded by the appropriate officer, board or agency of a political subdivision or of any district therein. . . . to the lowest responsible bidder furnishing the required security after advertisement for sealed bids in the manner provided by this section . . . .

2. Advertisement for bids shall be published in official newspaper or news papers, if any, or otherwise in a newspaper or newspapers designated for such purpose. Such advertisement shall contain a statement of the time when and place where all bids received pursuant to such notice shall be publicly opened and read. . . . All bids received shall be publicly opened and read at the time and place so specified. At least five days shall elapse between the first publication of such advertisement and the date so specified for the opening and reading of bids.

Section 105. Disposition of deposit accompanying bid

1. . . . Wherever as a condition precedent to the reception of consideration of a bid for furnishing supplies, materials or equipment or performing work for a political subdivision . . . . or if any district therein, a deposit of a certified check, money, bonds or other obligation is required, a person or corporation submitting a bid may withdraw the same if no award of the contract be made within forty-five days after the receipt thereof, and upon such withdrawal such deposit shall be forthwith returned...

LOCAL FINANCE LAW - Excerpts

Section 11.00 Periods of Probable Usefulness

a. A municipality, school district or district corporation may not contract indebtedness for any object or purpose for a period longer than the period of probable usefulness set forth below ... Preliminary costs of surveys, maps, plans, estimates and hearings in connection with a capital improvement, and cost incidental to such improvement, ... shall be deemed part of cost of the object or purpose ...

11. Buildings. The acquisition or construction of buildings ... whether or not including grading or improvement of the site, original furnishings, equipment, machinery or apparatus required for the purposes for which such buildings are to be used, as follows:

(a) Class "A" (fireproof and certain fire resistant) buildings.

(1) Buildings, the walls of which are constructed of brick, stone, concrete, metal or other incombustible material, and in which there are no wooden beams or lintels, except wood glue laminated structural members, and in which the floors, roofs, stair halls, and other means of vertical communication between floors and their enclosures are built entirely of brick, stone, metal or other incombustible materials, and in which no woodwork or other inflammable material is used in any of the rough partitions, floor or ceiling structures, or

(2) Buildings, not more than one story above the ground, the outer walls of which are constructed of brick,

stone, concrete, metal, stucco or other fire resisting material and which are to be used by school districts wholly outside of a city, thirty years.
(b) Class "B" (fire-resistant) buildings.
Buildings, the outer walls of which are constructed of brick, stone, concrete, metal, stucco or other fire resisting materials, twenty years.
(c) Class "C" buildings. Buildings which are neither Class "A" or Class "B", as defined in items (a) and (1) above, including any such building which is rebuilt or altered so that it, together with any addition or vertical or other extension is not fire-proof or fire resisting, as thus defined, fifteen years.

12. Additions to or conversion of buildings.

(a)(1) The construction of an addition or additions to or the reconstruction of a Class "A" building, twenty years, except as hereinafter provided: the conversion of a Class "B" or Class "C" building, into a Class "A" building, twenty years ...

(2) The construction of an addition or additions to or the reconstruction of a Class "B" building or the conversion of a Class "C" building into a Class "B" building, fifteen years.

(3) The construction of an addition or additions to or the reconstruction of a Class "C" building, ten years.

(b) The periods of probable usefulness set forth in item (a) above shall include original furnishings, equipment, machinery or apparatus required for the purposes for which such additions to such building or for which such reconstructed or converted buildings are to be used.

(c) A building which is to be attached to an existing building or buildings shall be deemed to be a new building and not an addition if the probable useful life thereof is not dependent upon the useful life of such existing building or buildings.

(d) The terms "Class 'A' building", "Class 'B' building", and "Class 'C' building" as used in this subdivision, shall mean such buildings as they are described in subdivision eleven of this paragraph.

13. Certain building alterations. The installation or reconstruction of a heating plant, lighting, plumbing, ventilating, elevator or power plant or system in a building when not in connection with the original construction or the reconstruction of such building, in a Class "A" or "B" building, ten years; in a Class "C" building, five years ...

Section 165.00 Deposit and use of proceeds from sale of bonds, bond anticipation notes, capital notes, urban renewal notes or budget notes.

a. The proceeds, inclusive of premiums, from the sale of bonds, bond anticipation notes, capital notes, urban renewal notes or budget notes shall be deposited in a special account in a bank or trust company located and authorized to do business in this state, shall not be commingled with other funds of the issuer, and shall be expended only for the object or purpose for which such obligations were issued. In the event that any portion of the proceeds ... is not expended for the object or purpose for which such obligations were issued, such portion shall be applied only to the payment of the principal of, and interest on such obligations, respectively . . . .

APPENDIX D

REGENTS RULES AND REGULATIONS OF THE COMMISSIONER RELATING TO EDUCATIONAL FACILITIES

REGENTS RULES (8 NYCRR 14) Section 14.1 - School Buildings and Grounds

a. Regulations. The Commissioner shall make regulations governing the requirements for the plans and specifications for the erection, repair, enlargement and remodeling of school buildings.

b. General requirement. Each school district shall provide suitable and adequate school buildings and grounds for the instruction and accommodation of the pupils of such district.

REGULATIONS OF THE COMMISSIONER OF EDUCATION
Part 155
(8 NYCRR 155)

EDUCATIONAL FACILITIES

Section 155.1 Educational facilities. Each school district shall provide suitable and adequate facilities to accommodate the program of such district.

(a) Each school district shall develop and keep on file, a comprehensive long-range plan pertaining to educational facilities. Such plan shall be reevaluated and made current at least annually, and shall include appraisal of the following: the educational philosophy of the district, with resulting administrative organization and program requirements; present and projected pupil enrollments; space use and state rated pupil capacity of existing facilities; priority of need of maintenance, repair or modernization of existing facilities, including consideration of the obsolescence and retirement of certain facilities; and the provision of additional facilities.

(1) The number, types, space requirements and pupil capacities of facilities shall be in relation to the present and projected needs of the school district programs, including mandated educational requirements.

(2) Pupil enrollment projections shall be based on a school district census projection of each grade level. Elementary grade enrollments, kindergarten through sixth grade, shall be projected a maximum of five years. Secondary grade enrollments, seventh through twelfth grade, shall be projected a maximum of ten years.

(3) Educational specifications for the erection, enlargement or remodeling of educational facilities shall be submitted to the Commissioner. Such specifications shall be based on the comprehensive long-range plan of the district and shall include the educational philosophy of the project, description of educational program, including activities to be conducted and related space and facilities requirements; and description of innovative or experimental concepts or features which may be included.

(a) (4) Each school district shall prepare a five-year capital assets preservation plan no later

than July 1, 1988, and shall update such plan annually. Such plan shall be prepared in a manner and in a format prescribed by the commissioner and copies of such plan shall abe submitted to the commissioner upon request. Such plan shall include, but shall not be limited to:

(i) a breakdown for each of the five years of the plan of the estimated expenses for the following:

(a) current or proposed new construction;

(b) current or proposed additions to schools facilities;

(c) current or proposed alterations or reconstructions of school facilities;

(d) major repairs;

(e) operations and maintenance; and

(f) energy consumption;

(ii) a district wide capital assets inventory which shall include, but not be limited to:

(a) the number and type of facilities owned, operated or leased by the district;

(b) the use and size of such buildings:

(c) the energy sources for such buildings; and

(d) any other information which may be deemed necessary by the commissioner to evaluate safety and health conditions in school facilities; and

(iii) a report on the condition of each school facility and a specific preservation plan for each school facility.

(b) Facilities shall be designed and constructed to provide for the health and safety of occupants with consideration of educational and planning efficiency, conservation of natural resources, practicality, and initial and long-range economy, and shall support an environment within the facility which is conducive to learning.

(1) Design of a facility shall provide space layouts and number, size and arrangement of exit facilities that will insure prompt escape of occupants from a hazard to life safety.

(2) Visual environment of a facility. (i) Adequate levels of illumination, consistent with efficient energy consumption, shall be provided in each area of a facility for the tasks being performed.

(ii) Natural and artificial lighting shall produce a controlled environment of balanced brightness, free from objectionable glare.

(iii) Teaching areas shall have fenestration which permits a view of the exterior, unless otherwise approved by the Commissioner.

(iv) Teaching spaces shall be properly proportioned as to size and shape of room, including ceiling height.

(v) Color, finishes, lighting, furnishings and related items shall reasonably be combined to provide an aesthetic learning environment.

(vi) A report that new installations and replacements of mercury vapor or metal halide lamps are of a fail-safe type which self-extinguish if the shielding of the lamp is broken, cracked or removed shall be included in the annual fire inspection report filed pursuant to Education Law, section 807-a. If such fail-safe type lamps are unavailable, the report shall state that an ultraviolet radiation-absorbing shield has been provided for each new or replacement mercury vapor or metal halide lamp, in accordance with the provisions of section 409-b of the Education Law.

(3) Thermal environment of a facility. (i) Controlled heating and ventilation shall be provided and maintained in all areas to produce conditions suitable for the varying activities that take place in the various areas by systems providing efficient consumption of energy.

(ii) Each teaching space shall be provided with a controlled supply of fresh air and shall have sufficient air changes to produce healthful conditions and avoid odors or build-up or concentrations of toxic substances or dust particles.

(iii) When teaching spaces cannot be provided with an adequate thermal environment by ventilation as determined by the Commissioner, provision for cooling may be required by the Commissioner.

(4) Sanitation. (i) Water shall be safe and potable from an approved source and shall be dispensed within a facility from sanitary drinking fountains.

(ii) Toilet rooms shall have an adequate number of proper fixtures.

(iii) Sanitary sewers shall be connected to a municipal sewage system or an approved on site disposal system.

(c) Sites for the erection or enlargement of facilities shall be approved by the Commissioner, provided they have been selected with reasonable consideration of the following factors:

(1) Size and location of a site shall be consistent with the long-term building plans of the district;

(2) Sites shall be educationally adaptable with consideration for situation of building and development of the grounds for outdoor educational program and related activities, without excessive initial or development costs and shall provide the following minimum usable acres, unless otherwise approved by the Commissioner:

(i) Elementary schools (kindergarten through sixth grade): Three acres base plus one acre for each 100 pupils, or fraction thereof;

(ii) Secondary schools (7th through 12th grade): 10 acres base plus one acre for each 100 pupils, or fraction thereof;

(3) Sites shall be developed to conserve natural resources and avoid environmental problems within the limits of the educational program. Care shall be taken to insure that the site and facilities thereon are consistent with and contribute to the school and community environment and provide for the health and safety of occupants.

(d) *Inspection of Facilities*. (1) Structural safety inspection. To insure that all facilities occupied by students are properly maintained and preserved and provide a suitable educational setting, the board of education of each school district shall cause such facilities owned by the district to be inspected in accordance with Section 409-d of the Education Law and this paragraph. A visual inspection of structural elements of all school buildings occupied by students shall be conducted annually.

(i) (a) In districts other than city school districts in cities having 125,000 inhabitants or more, annual structural inspections;

(1) shall include, but not be limited to, inspection of exterior wall components, doors, windows, retaining walls, roofs, and interior building components for evidence of movement, deterioration and structural failure;

(2) shall be conducted by a team which is composed of at least the director of facilities, the building custodian and a code enforcement official; and

(3) shall be made prior to the 30th day of June of each school year.

(b) In city school districts in cities having 125,000 inhabitants or more, the visual structural inspection shall be conducted in accordance with standards established by the board of education of such city school district and submitted to the commissioner for approval.

(c) Annual visual safety inspections shall be made prior to the 30th day of June of each school year. Reports of such inspections shall be retained in district files for six years after the building no longer exists, but not less than 21 years, whichever is longer. Such reports shall be available to the public on request.

(ii) When a visual structural inspection discloses evidence of a possible defective structural condition, a licensed professional engineer shall be retained immediately to inspect the condition and ascertain if structural modifications are necessary. The architect or engineer shall present a written report of all findings to the board of education, which shall act to correct any defective structural conditions.

(iii) Building aid computed pursuant to paragraph (d) of subdivision 6 of section 3602 of the Education Law is available for inspections by a licensed architect or engineer which result from the annual visual structural inspection of a building if no claim for building aid for such an inspection in such building has been filed in the previous five years. The apportionment of such building aid for each school building so inspected by a school district in the base year shall not exceed the lesser of: the product of the building aid ratio and the actual cost, or the structural inspection aid ceiling computed by the commissioner. For aid payable in the 1993-94 school year and thereafter, the structural inspection aid ceiling shall be the sum of $10,000 plus an additional amount computed as follows:

(a) The monthly indices for the costs of labor and material determined by the New York State Department of Labor, adjusted for the base month of July 1993, shall be used to compute such additional amount. The commissioner shall compute an index number which shall equal the positive remainder resulting when one is subtracted from the quotient of the Department of Labor index for July of the current year divided by the Department of Labor index for July 1993.

(b) The additional amount shall be the positive result of the product of $10,000 and

the index number computed pursuant to clause (a) of this subparagraph for the month of July in the current year.

(iv) Reports of structural inspections by the licensed architect or engineer shall be submitted to the commissioner together with any claim for building aid. For districts other than city school districts in cities having 125,000 inhabitants or more, copies of the reports shall also be submitted to the appropriate district superintendent of schools. A claim for building aid shall be made, in a form prescribed by the commissioner, within six months of the date of the architect's or engineer's report, for aid payable in the following school year.

Section 155.2 Construction and remodeling of school district facilities. (a) Plans and specifications for the erection, enlargement, repair or remodeling of facilities of school districts, other than in city school districts in cities having one million inhabitants or more, and the boards of cooperative educational services, shall be submitted to the Commissioner when the contemplated construction costs of such work are $10,000* or more, and for all projects affecting the health and safety of pupils.

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* When construction costs are ten thousand dollars or more, building construction aid, pursuant to Education Law, Section 3602, is available for eligible capital outlays.

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(1) Plans and specifications, including addenda and change orders, shall be submitted to the Commissioner for approval in accordance with procedures set forth by the Commissioner. When approved, one set of plans and specifications shall be retained and one set, with approval of the Commissioner endorsed thereon, returned to school authorities for permanent filing.

(i) Plans and specifications shall conform tot he State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250) and to this Part, and shall show in detail requirements of design and construction, space layout, circulation and exiting facilities, smoke and fire control, accident protection, visual and thermal environment and related electrical and mechanical work, and sanitation and related plumbing work which insure the health, safety and comfort of occupants of the facility.

(ii) Materials, equipment, and types of construction which may endanger the health, safety and comfort of occupants shall not be used.

(iii) Construction materials, details and workmanship shall conform to generally accepted standards as determined by the Commissioner.

(iv) Specifications for construction shall allow for equivalencies and shall not require the base bid to be based only on the materials or products specified.

(v) Specifications for construction shall require that contractors or suppliers furnishing mechanical equipment shall instruct the governing body of the school district or board of cooperative educational services or its representative in the proper operation and service of all such equipment at the time of completion and before acceptance of the building by such governing body.

(vi) Should accounting, tabulation or computer equipment be requested as original equipment, the plans and specifications shall conspicuously identify the areas or spaces for the installation of such equipment. Such plans and specifications shall contain a description

of the equipment, its estimated costs, the need for and purpose of such equipment, a description of the space required to house the equipment, including the proposed pupil capacity of such space, and a description of the integral relationship between the construction work and the equipment. Such equipment shall not be approved for purposes of building aid computed pursuant to section 3602(6) of the Education Law, when located outside the constructed or reconstructed space or when not shown to have a direct integral relationship to the construction work.

(2) Plans and specifications for portions of facilities which require approval by other departments of the State shall be approved by the appropriate agencies having jurisdiction as a condition of commissioner's approval of plans and specifications of a facility.

(3) Decisions regarding compliance of plans and specifications with this section shall be determined by the Commissioner.

(4) Plans and specifications submitted to the commissioner shall bear the signature and seal of an architect or engineer licensed to practice in the State of New York. The architect or engineer who sealed the plans and specifications shall also certify that the plans and specifications conform to the standards set forth in the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250) and the State Energy Conservation Construction Code (NYCRR Parts 7810 through 7816).

(5) Upon approval of plans and specifications, the commissioner will issue a building permit subject to the following qualifications:

(i) During construction, the project shall be properly supervised by a licensed architect or engineer.

(ii) The building permit may be revoked by the commissioner in the event of violations of the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250), this Part or other safety standards imposed by law or regulation.

(6) Following completion of the project or a substantial portion thereof, the architect or engineer shall certify to the commissioner that the project was completed in conformance to the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250) this part, and plans and specifications for the project which were previously approved by the commissioner.

(b) For remodeling or construction projects costing $5,000 or more, the governing body of a school district or a board of cooperative educational services shall assure compliance with the requirements of the State Uniform Fire Prevention and Building Code and of this Part, and shall retain the services of an architect or engineer licensed to practice in New York State.

(c) For remodeling or construction projects costing less then $5,000, the governing body of a school district or a board of cooperative educational services shall assure compliance with the requirements of the State Uniform Fire Prevention and Building Code and of this part.

Section 155.3 Health and safety in existing educational facilities. Facilities in school districts other than city school districts in cities having 125,000 inhabitants or more, shall met the following requirements, and in particular instances, such other requirements as may be deemed necessary by the commissioner to insure the health and safety and accident protection of occupants.

(a) Exits. (1) There shall be at least two means of egress remote from each other, leading from each floor occupied by pupils, including basements.

(i) When pupils enter into a corridor there shall be a choice of two unobstructed means of egress in different directions.

(ii) Handrails shall be provided on at least one side of stairways, and on both sides of stairways 88 inches or more in width.

(iii) There shall be no storage under any stairs or landings unless the enclosure is of approved fire resistant construction.

(iv) Provision of fire escapes of approved design may be required where other exits are determined to be inadequate for fire safety.

(2) Dead-end corridor pockets shall not exceed a maximum depth of 1½ times the width of the pocket or 1½ times the width of the corridor, whichever is less, unless otherwise approved by the Commissioner.

(3) Corridors and exit ways shall be kept clear and free of obstructions at all times.

(4) Fixed and portable security gates shall not be located or used where they will obstruct exits or create dead-end conditions for occupied spaces.

(5) Every space of pupil occupancy over 500 square feet in area shall have two separate means of egress from such space. A *space of pupil occupancy* is any room or self-contained space housing pupils on a regular basis, other than a place of assembly or small rooms where no more than 10 pupils are under direct, responsible, adult supervision. Each means of egress shall be in a separate smoke zone, unless immediately adjacent to an approved exit. The primary exit is commonly the opening to the corridor. The second means of egress may be a door opening into a separate smoke zone, or a door directly to the exterior, or an emergency rescue window of such size and design that will facilitate egress, or a door providing egress through adjacent spaces where specifically approved.

(i) Any point in a space of pupil occupancy shall not exceed a maximum of 50 feet straight-line distance to an exit, unless otherwise approved by the commissioner. Any additional exit necessary to satisfy this requirement shall be remote and may be required to be directly to the exterior.

(ii) When spaces of pupil occupancy are defined in an open area by wardrobes, cabinetry and other furniture which does not present obstructions to egress and which allows students to circulate freely from one space to another, the total open space is considered, for exiting purposes, as a single space. Exits from such open-planned space shall meet requirements determined by the commissioner.

(6) Required emergency rescue windows shall be of a size and design, including hardware and, in appropriate instances, steps or ladder to high sills, that will permit and facilitate emergency egress. Such windows shall be free of obstructing screens or storm sash.

(i) The minimum clear opening area for such windows shall be six square feet, with a minimum dimension of 24 inches, unless otherwise approved by the commissioner.

(ii) At least one such window in each space of pupil occupancy shall be marked with an appropriate sign identifying it as an emergency egress window.

(7) Places of Assembly. A place of assembly is any area used for the assembly of 100 or more persons, and spaces over 1800 square feet in area used for the assembling of persons. A place of assembly shall have at least two exits remote from each other.

(i) Maximum occupancy for places of assembly shall be based on the number and size of existing approved exits on the basis of 50 persons for each one-half exit unit of 11 inches. Where existing exits are inadequate for the occupancy capacity of a place of assembly, or when directed by the Commissioner, signs restricting the number of occupants shall be conspicuously posted at each exit location. Signs shall read in red letters on white background:

"MAXIMUM OCCUPANCY	-	3" high, 3/4" stroke
NOT TO EXCEED	-	2" high, 1/2" stroke
XXX PERSONS"	-	3" high, 3/4" stroke

(8) Courtyards with completely enclosed perimeters are areas of possible pupil occupancy and must be provided with exits as a space of pupil occupancy and as follows, unless otherwise approved by the Commissioner:

(i) Enclosed courts up to 700 square foot area shall have at least one exit equipped with hardware of a type which will always permit the door to be opened from the court side without the use of a key;

(ii) Enclosed courts of more than 700 square foot area shall have at least two exits, remote from each other, equipped with hardware of a type which will always permit the door to be opened from the court side without the use of a key.

(9) Hardware. (i) All door hardware from spaces of pupil occupancy shall be of a type that will always permit the door to be opened from within the space without the use of a key.

(ii) All exterior and interior doors in exit ways, and exit doors from places of assembly shall have panic hardware, except that panic hardware is not required for push/ pull interior exit doors if these doors have non-latching hardware. Panic hardware shall not be required for exterior corridor doors serving less than 3 classrooms or for doors serving only service areas such as boiler room, kitchen or storerooms.

(iii) Exit doors shall not be locked or chained or otherwise rendered inoperable from the inside at any time.

(b) Smoke and Fire Control. As used in this subdivision, the terms Class "A", "B" or "C" refer to types of construction which are defined by subdivision 11 of section 11 of the Local Finance Law.

(1) In Class "B" and Class "C" buildings of two stories or more, unless otherwise approved, stairs shall be enclosed at each floor level and every floor shall be separated from levels above and below by stair enclosures and/or smoke barriers constructed to obstruct effectively the passage of smoke and fumes, or every space of pupil occupancy shall be provided with direct exit to the exterior. In appropriate instances, alternate means of egress may be required and stairway enclosures in Class "A" construction may be required.

(2) Class "B" and Class "C" buildings shall not have places of assembly above the first floor, except in a Class "B" building a written exception may be granted where it is determined by the Commissioner that adequate exits exist.

(3) In appropriate instances, doors, walls and ceilings of places of assembly and exit ways (corridors, stairs, vestibules, etc.) may be required to be finished with fire retardant materials or coatings.

(4) Stairway enclosures required by paragraph 1 of this subdivision and smoke barriers required by paragraph 5 of subdivision (a) of this section shall be constructed of non-combustible materials of such design and detail to obstruct effectively the passage of smoke and fumes.

(i) Doors in stair enclosures and smoke barriers shall be metal, metal covered, approved treated wood construction, or solid bonded core wood doors not less than 1 3/4-inches thick.

(ii) Glazing in doors, sidelights and frames shall be 1/4-inch wire glass.

(iii) Such doors shall swing in the direction of egress, with no latching or locking devices unless operated by panic hardware. Double-acting hinged doors are not permitted and corridor pockets opposing swing of doors shall conform to the provisions of paragraph 2 of subdivision (a) of this section.

(iv) Such doors shall be self-closing and maintained in a normally closed position unless approved automatic release devices are provided, whereby upon interruption of an electrical circuit, the door is released and becomes self-closing. The electrical circuit shall be positively interrupted by operation of an approved smoke detection system and/or activation of the building fire alarm system. Fusible links shall not be used to hold open such doors.

(5) Wood floors shall not be treated or finished with oil. Floors so finished previously shall be cleaned and refinished with a penetrating seal.

(6) Fire extinguishers shall be located so that no point in a corridor, lobby, or stair is more than 120 feet from an extinguisher. Fire extinguishers shall also be placed readily accessible to auditorium stages, shops, cafeterias and kitchens, boiler rooms, science labs and accessible from other places which are possible sources of fire. Fire extinguishers shall bear the Underwriter's label and be of a type most suitable for the kind of fire most likely to occur in a given area.

(7) Fire resistive (hourly rated) floors, interior walls and doors, and ceilings shall be provided at the following spaces unless otherwise approved by the Commissioner. Those spaces having a roof over the entire space may have roof construction and ceilings of non-rated fire resistive materials.

(i) Two-hour fire-rated construction with 1/2 hour fire rated, self-closing fire doors are required at:

(a) boiler, heater or furnace rooms;
(b) refrigeration, electrical, and equipment rooms;
(c) incinerator rooms;
(d) storeroom for fuel, flammable liquids and gas powered equipment; and
(e) transformer vaults.

(ii) Required fire doors shall be maintained in a normally closed position and not held open by fusible links.

(iii) Combustible attic space shall not be used for storage.

(c) *Accident Protection.* (1) Glazing of panels and doors shall be with safety glazing materials as

follows, unless glazed areas are protected by approved grilles, or rails:

(i) interior exit doors, exterior exit doors and immediately adjacent sidelights except where glazing is 48 inches or more above the floor;

(ii) all glazed panels where glazing is within 18-inches of the floor, or platform level of music room type risers;

(iii) gymnasiums and playrooms and elsewhere where subject to physical abuse;

(iv) acceptable safety glazing materials shall be at least one-quarter inch thick wire glass, one-quarter inch tempered (heat treated) glass, one-quarter inch laminated safety glass, or approved plastic materials.

(2) Glazed doors and sidelights within 6 feet of such doors shall be marked by appropriate means in accord with the provisions of Part 47 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York, except marking on door and/or sidelight is not required:

(i) where less than 80% of the ares of the door or sidelight above a reference line 18 inches above the floor is glazed;

(ii) where width of sidelight is not more than 20 inches, with 1 3/4-inch minimum opaque stiles;

(iii) where floor treatment a distance of 3 feet out from a sidelight will deter approach;

(iv) where sidelights are supported on 18-inch minimum height opaque sill and wall construction;

(v) where sidelights are protected by approved 18-inch minimum height permanent barriers such as benches, planters, or guardrails, extending across at least two-thirds of the sidelight.

(3) Window Cleaning. Safety provisions shall be made for persons engaged in window cleaning. Windows shall be cleaned from approved safe surfaces, window sills or ledges, boatswains chairs, or scaffolds, all as defined in Part 21 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York.

(i) A safe surface is a place where the cleaner is working not over six feet off the floor or grade and not over three feet above a stair run. Ladders may be used generally when the top of the window is not over 35 feet above grade or floor. Window sills and ledges may be used when the window openings are provided with approved anchors for use with safety belts. Approved boatswains chairs and scaffold also may be used.

(d) *Mechanical*. Mechanical equipment, heat-producing and cooling equipment, auxiliary apparatus and controls, and installation and use of same shall be such as will insure safe operation in accord with applicable recognized standards as determined by the commissioner and be consistent with efficient energy consumption.

(1) Gas and oil fuel-burning equipment having a capacity of over 400,000 BTU per hour shall be provided with electronic flame safeguard controls which, upon flame failure, shall normally respond in two to four seconds to cut off fuel supply through the burner and main fuel valve.

(2) All primary controls for fuel-burning equipment shall operate on a 120-volt, single-phase, grounded circuit. Such controls generally include the hold-in coil of the motor starter, the solenoid coil for the pilot valve, the solenoid coil for the main fuel valve or the actuator for the motorized fuel valve, the ignition transformer, and the modulator transformer.

(3) Direct fired fuel-burning heating units shall not be used in any space of pupil occupancy.

(4) Unused duct work shall be sealed off at each floor level with fire resistive materials.

(5) Ventilation with fresh air shall be available in all spaces of pupil occupancy.

(e) *Water and Sanitation*. (1) An adequate supply of safe, potable water for drinking shall be dispensed from approved sanitary drinking fountains.

(2) Toilet rooms for boys and girls with flush toilets and wash sinks which are connected to an adequate water supply under pressure, and connected to an approved individual or public sewage disposal system shall be provided.

(3) No source of water supply, nor sewage-disposal system, shall be used which has not been approved by the appropriate agency of the State Department of Health or Department of Environmental Conservation.

(f) *Gas*. (1) Gas entering a school building shall be low-pressure gas.

(2) Gas transmission and distribution piping shall meet the requirements of the Public Service Commission.

(g) *Electrical*. Electrical equipment and auxiliary apparatus and controls, and installation and use of same shall be such as will insure safe operation in accord with applicable recognized standards as determined by the Commissioner and be consistent with efficient energy consumption.

(1) Suitable and sufficient artificial light shall be provided for the visual tasks being performed.

(2) Exit Lights. School buildings shall be provided with exit lights to identify building exits, stairs, corridors, and exits from places of assembly, and to designate the path of travel to the exterior, except school buildings having six or less classroom areas may have exit signs in place of exit lights.

(i) The word "EXIT" shall be in letters not less than 4 1/2 inches high and strokes not less than 3/4 inches wide.

(ii) Exit lights shall be circuited and wired to minimize the possibility of interruption.

(3) Emergency Lighting. Automatic emergency lighting systems shall be provided for places of assembly exceeding an area of 1800 square feet and for all exit ways leading from such areas. Such areas include all-purpose rooms, auditoriums, cafeterias, large group-instruction rooms, play-rooms and gymnasiums, swimming pools and other combination places of assembly.

(4) Fire Alarm. (i) School buildings of seven or more classroom areas shall be equipped with a manually operated electric fire-alarm system, which may include automatic smoke and/or fire detection, which will continue to sound the alarm until the tripped station has been restored to normal operation or, in an existing system, has completed a cycle of not less than 30 seconds.

(ii) School buildings of one-to six-classroom areas shall be equipped with either a manual, hand or electric fire alarm which is capable of being sounded for such a period of time as will insure evacuation of the building, or an electric fire-alarm system as described in subparagraph (i) of this paragraph.

(iii) School buildings within fire districts having an electrically operated, street located general municipal fire-alarm box system shall have, wherever practical, the school building fire-alarm system interconnected to the municipal system, so that sounding of the school building fire-alarm system automatically gives the alarm to the fire department affording protection to the school building. Where ever practical, a fire alarm box compatible with the municipal system, which will sound the alarm of the school building system, shall be accessibly located on the site or on the school building.

(5) *Telephone*. A telephone which can be used in the case of emergency shall be provided in all buildings having pupil occupancy.

(h) *Additions and Alterations*. In the case of additions to or alterations of an existing facility, the requirements of this section must be continuously maintained during the construction period or provisions made to provide equivalent safety to the school-district-occupied portions of the facility.

(i) Facilities shall be operated and maintained to provide effectively for the accident protection and life-safety of occupants, to reduce exposure to property loss by fire, and to assure efficient use of natural resources.

(j) When, based on these regulations, it is the judgment of the Commissioner that the general conditions of a school building, or any part thereof, indicate that it would be detrimental to the health and safety of occupants, the commissioner may designate an area or areas of the building as unusable for pupil occupancy or may limit the number of occupants thereof.

155.4 Fire and building safety inspections. (a) All buildings which are owned, operated or leased by a public school district or board of cooperative educational services shall be inspected for fire safety at least once annually, pursuant to a schedule determined by the commissioner, or at any other time deemed necessary by the commissioner. Any cost of such inspection shall be borne by the school district or board of cooperative educational services.

(b) All inspections shall be performed, within a period of time determined by the commissioner, by an inspector who is qualified pursuant to procedures established by the State Fire Administrator. The report of the inspection shall be on a form supplied by the commissioner.

(c) Any violation of the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250) or of this Part shall be corrected immediately unless it is impracticable to do so. Violations which are not corrected immediately shall be corrected with in a period time approved by the commissioner.

(d) Where a board of education or board of cooperative educational services is required to convene meetings pursuant to sections 807-a(5)(e) of the Education Law, the Board shall:

(1) review each nonconformance with the requirements of section 155.3 of this Part or of 9 NYCRR Parts 1150 through 1197 recorded on the report during the fire inspection;

(2) identify all such nonconformances which have not been corrected by the date of the meeting; and

(3) adopt a plan, in a form prescribed by the commissioner, for correcting all such nonconformances.

(e) No building which is owned, operated or leased by a board of education or a board of cooperative educational services shall be occupied or otherwise used unless the building has a valid certificate of occupancy issued by the commissioner.

(1) A certificate of occupancy will be issued by the commissioner following the annual inspection, if the inspection indicates the building is suitable for occupancy and free of violations of the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 6700 through 1250 and of this Part.

(2) The commissioner may issue a temporary certificate of occupancy at any time if the building is suitable for occupancy and if the board of education or board of cooperative educational services has adopted a plan, subsequently approved by the commissioner, for correcting all violations, pursuant to subdivision (c) of the section.

(3) A certificate of occupancy, a temporary certificate of occupancy at any time if the building is suitable for occupancy and if the board of education or board of cooperative educational services has adopted a plan, subsequently approved by the commissioner, for correcting all violations, pursuant to subdivision (c) of this section.

(i) failure to comply with any provision of this Part;

(ii) failure to comply with any provisions of the State Uniform Fire Prevention and Building Code (9 NYCRR Parts 600 through 1250);

(iii) Failure to comply with the provisions of section 807-a of the Education Law;

(iv) failure to file an annual or other fire safety inspection report in a timely manner;

(v) failure to correct and or plan for correction of any conformance with the requirements of section 155.3 of this Part, or of 9 NYCRR Parts 1150 through 1197, which appears on the fire safety inspection report in a timely manner;

(vi) existence of any nonconformance wit the requirements of section 155.3 of this Part, or of 9 NYCRR Parts 1150 through 1197, which appears on the fire safety report and which indicates that a building is not suitable for occupancy or intended use;

(vii) repeated violations of the State Uniform Fire Preventions and Building Code (9 NYCRR Parts 600 through 1250) or this Part; or

(viii) violation of other health or safety standards, imposed by law or regulation, which indicate that a building is not suitable for occupancy or intended use.

Please Note: Sections beyond 155.4 will be included in future editions of the Manual.

APPENDIX E

TEMPORARY QUARTERS

E-1 GENERAL

a. Temporary quarters shall be approved annually by the Commissioner, pursuant to Section 155.4 of the Regulations of the Commissioner. Such facilities must meet specific requirements of educational adequacy and of health and safety prior to approval and occupancy.

E-2 TYPES OF TEMPORARY QUARTERS

a. Temporary quarters take many forms; for the purposes of the Department, one of two categories applies:

1. Leased space for educational use, acquired pursuant to Education Law, Section 1709.7 (Church rooms, grange halls, store fronts etc.)

2. Leased space for other than educational use, acquired pursuant to Education Law, Section 1709.7 (Administration, office, storage, etc.)

E-3 REQUIREMENTS

a. Temporary Quarters shall meet the provisions of Section 155.3 of the Regulations of the Commissioner. To ascertain compliance a set of plans showing all floor levels of the building, areas to be leased (use and square footage), exit paths to the exterior, and a plot plan are needed.

1. REQUEST FOR APPROVAL OF USE OF A FACILITY (yellow form FP-AU) including page 2 outline specifications and authorizing signatures.
2. FIRE SAFETY REPORT. Completion of all items on the cover and Part I. Completion and conflicts in Section II-A (only if student occupied), and Section II-B.
3. CERTIFICATION by a New York State licensed architect or engineer or a copy of the latest local building department CERTIFICATE OF OCCUPANCY. Certification must include those spaces being occupied and their exit path tot he exterior. C of O should be issued in the district's name for the use being approved.
4. Proof of the existence of an Asbestos Maintenance Plan (copy of AHERA 5) or certification that no asbestos was used in construction.
5. The Plans must show:
   - i) Remote exits from every floor.
   - ii) Egress into two separate smoke zones from spaces of pupil occupancy over 500 sq. ft. (155.3a5)
   - iii) Limit dead end corridor pockets to a maximum of 1/2 times the corridor width (155.3a2).
   - iv) Fire ratings separating direct fired heating equipment.
   - v) Handicapped access in accordance with the New York State Uniform Fire Prevention and Building Code, Americans with Disabilities act (ADA) and Section 504.

APPENDIX F

HEALTH AND SAFETY DURING CONSTRUCTION

F-1 GENERAL

School districts shall avoid engaging in renovation and construction projects while school is in session, but if such projects must be conducted, affected areas, to the degree possible, shall be isolated from students and school personnel.

When a construction project is in, or on, an existing building which continues in operation, plans and specifications must assure that the work site(s) are completely isolated from occupied portion(s) of the building and that precautions are taken to assure that any operations or hazards in the work site(s) will not affect the occupants of the building. Further, existing exiting features of the occupied portion(s) of the building must be continuously maintained, or alternative exits provided; and existing fire safety systems such as fire alarm, detection and exit and emergency lights, must be continuously maintained or provisions made to provide equivalent safety; and the fire department must be notified of any non-operating system(s).

The above caution appears in the Instruction Guide for Obtaining a Building Permit and Approval of Plans and Specifications by the Commissioner of Education which is sent to the district in connection with every capital construction project submitted to the Office of Facilities Planning. Even so, a common parent complaint heard by the staff of the office can be traced to renovation or addition work being performed in an occupied building. Complaints involve unidentified dust and solvent or paint odors as well as breaches in the integrity of the separation of the work areas and occupied spaces. Open construction areas, unattended construction equipment, and inappropriate or unauthorized use of school facilities, such as student toilets by construction personnel also cause problems. Parent complaints often relate to alleged student illnesses and can lead to negative television and press coverage.

Construction projects must account for the health and safety of building occupants as well as the contractor and construction crew. Contracts must be clear about the contractor maintaining separation of construction areas and occupied spaces. The code is specific about corridor enclosure requirements and ventilation of contaminants. **Districts must ensure that their Architect or Engineer adequately address the above concerns in contract documents and that these concerns are adhered to during construction.**

a. Lead Hazards

1. Schools shall use appropriate methodology, based on federal Occupational Safety and Health Acts (OSHA), Housing and Urban Development (HUD) guidelines or other appropriate regulations, to ensure protection from exposure to lead dust and residue during lead clean-up, routine maintenance repair and renovation.

b. Asbestos

1. Schools shall follow federal Asbestos Hazard Emergency Response Act (AHERA) requirements for maintenance of declared or known asbestos containing building materials, maintenance of records, training and notification. New York State Department of Labor regulations for training and certification must be followed. New school buildings are required to be either inspected for asbestos or, in the case of new construction, certified to be asbestos free by the architect prior to occupancy.

APPENDIX G

DISTRICT ADMINISTRATION BUILDINGS

G-1 GENERAL

District Administration Buildings shall be designed and constructed to provide for the health, safety and comfort of the occupants. Review of plans and specifications by the Commissioner is based on conformance with the New York State Uniform Fire Prevention and Building Code as well as the requirements of this Manual of Planning Standards listed below.

a. Exiting

1. Remote exits from each floor.
2. Restriction of dead-end corridor pockets.
3. Two means of egress from room over 500 square foot area - one of which may be an escape window.
4. Remote exits from rooms over 1500 square foot area.
5. Exiting of Areas of Assembly.
6. Hardware for interior exits and exterior exits.
7. Stair enclosures.
8. Exit light system.

b. Fire Safety

1. Smoke control and separation between floors.
2. Fire resistant enclosure of boiler room, flammable liquid storage, etc.
3. Boiler/burner controls, electronic flame safeguards.
4. Fire alarm and detection systems.

APPENDIX H

SCHOOL BUS MAINTENANCE AND STORAGE FACILITIES

H-1 SITE DEVELOPMENT

a. construction of school bus maintenance and storage facilities is recommended to be on a site separate from a school building site, or if on the same site, as remote from a school building as possible.

1. If on the same site, in addition to the above:
   i. The facility shall not be attached to a school building.
   ii. Bus circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion. Bus driveway shall not encircle school buildings.
   iii. Public and staff parking shall not interfere with free movement of buses.

b. Sites with steep slopes should be avoided. A ten (10) percent slope is the maximum for vehicular traffic.

c. Paving Materials (such as blacktop and concrete) should provide a hard, dry, non-slippery surface. State and county highway specifications may be used for guidance.

1. Drives generally should be 12 feet wide; 20 feet wide if vehicles pass. Drives should be as short and direct as possible in consideration of initial cost, snow removal and maintenance.

2. Turning circle in front of garage doors should be a minimum of 90 foot in diameter; 110 foot diameter is recommended.

3. Lanes and parking areas should be designated with appropriate, signs and lines to provide safe and unrestricted bus circulation.

4. Parking areas for driver's and mechanic's vehicles should be provided and located to avoid interference with bus circulation.

d. Landscaping and planting should not restrict vision along drives nor at intersections, nor should it affect snow removal by being too close to the driveway. Screening at site boundaries is recommended when such is desirable due to adjacent land use.

e. Gas Pump Installations should be in a safe, accessible location, preferably remote form the garage building, and well protected from physical damage. Gasoline storage tanks should not be located under drives.

1. Blacktop paving deteriorates when subjected to spilled gasoline. Concrete or gravel should be considered in such locations.

H-2. DESIGN AND CONSTRUCTION

a. General: School bus maintenance and storage facilities should be designed and constructed to properly house the school district's current bus program and to facilitate future expansion and must afford adequate safety to all occupants of the facility. School districts are urged to avail themselves of the inspection services of all New York State agencies with regard to equipping, arranging,

operating and maintaining the facility to reasonably and adequately protect the health and safety of all persons using the facility.

1. New bus maintenance and storage facilities shall be designed in accordance with the following requirements.

2. Existing bus maintenance and storage facilities shall at least comply with the following requirements which are marked (**).

b. Bus Stalls: Depth of bus stalls should be a minimum of 40 feet clear, inside; 78 feet clear if in tandem.

1. Tandem stall layout should be considered if there are over seven stalls.

2. Storage stalls of 12 feet width are generally found to be satisfactory.

3. Repair and wash stalls should be a minimum of 16 feet wide (to facilitate pulling axles) by 50 feet long.

i. Repair stalls should be provided with at least 10 lineal feet of work bench and tool racks.

4. Storage areas for maintenance and repair items should be located convenient to maintenance facilities.

** c. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.

** 2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.

3. Door width at required exits shall be a minimum of 36 inches. A pass (wicket) door in an overhead door may be approved as one of the required exits.

4. Exitways shall be unobstructed, with a 36 inch minimum clear width passageway.

d. Walls, Partitions and Roof Construction are recommended to be of fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance, depreciation, insurance, etc. should indicate a suitable type of construction.

1. Bus service (repair) areas shall be separated from bus storage areas by two hour fire-rated construction, with self-closing Class B, fire-rated doors and frames.

2. Overhead construction and/or ceilings should be finished with reflective, light colors.

3. Rooms under mezzanine areas having occasional occupancy should be provided with ceilings having a fire-rated construction rating of at least one hour.

** e. Storage Rooms for flammable materials and heater rooms required by section 3-B-1, shall have walls and floor (and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

1. Doors of heater rooms should open directly to the exterior.

** 2. Combined storage and heater rooms are not recommended; however, in no case shall storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

** f. Floor Surface of maintenance facilities should be hard, dry, non-slippery, non-dusting, low in maintenance and properly pitched to drain.

1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

2. Floors of storage rooms containing flammable liquids should be constructed so as to confine any spillage of such liquids.

g. Toilet and Wash Facilities: Separate toilet room shall be provided for each sex, with no direct connection between the rooms. A minimum of one lavatory shall be provided in the toilet room for each water closet unless washing facilities are provided in the work area in proximity to the toilet room(s).

** 1. Construction shall be solid from floor to ceiling, minimum clear height 7'-6" with top sealed over.

** a. Walls, ceilings and compartment partitions shall be of non-absorbent material, or finished with light-colored water-repellent finish.

** b. Floor and base shall be of non-absorbent material at least equal to waterproofed cement. Base shall be 6" minimum height, coved at the bottom.

** c. Doors shall be unglazed, self-closing, with lock or latch, and hung so an to screen the interior from view.

** d. Water closets shall be enclosed in individual compartments if there are more than one, or if a water closet and one or more urinals.

** e. Every urinal shall be installed with integral sides, or supplementary screens, for privacy.

h. Dual-post Hydraulic Lift of 10 ton minimum capacity should be provided in a repair stall. Clear height above the lift must be increased over normal roof height - usually 4'-6" +.

1. Grease pits are less desirable than hydraulic lifts and are not common to new bus garage construction. However, if used, a grease pit should be 4 feet in depth, 40 feet minimum in length, 3'-6" minimum in width between side walls, and have both ends rounded. Pits should be protected by a 6 inch high concrete or steel curb around the perimeter, and

equipped with adequate remote stairs. Recessed storage facilities should be provided at pit floor level. Pits should also be provided with a drain, or sump and sump pump.

i. An Overhead Track and chain hoist assembly of one ton minimum capacity should be considered at the repair stall to facilitate pulling motors.

** j. Open-sided Floor Areas more than four feet from which a person can accidentally drop, guarded by 42 inch (minimum) high railings with intermediate rail or balusters, and a 4 inch high toeboard. An intermediate rail and toeboard is not required on platforms used for storing materials which are regularly passed over the edge. Two remotely located permanent stairs or ladders shall be provided to reach the upper level.

** 1. Exterior wall door openings four feet or more above grade shall be protected by railings.

** 2. Stairs shall be guarded on open sides by 36 inch high railings with intermediate rail or balusters.

** 3. Stairs shall have non-slip treads.

4. No access shall be provided to space under stairs.

k. Overhead Doors are recommended to be a minimum of 12 feet high. An 11 foot width is recommended. Double width doors (20 foot minimum) should also be considered.

1. Overhead doors should be glazed with clear wire at eye level.

2. Bumpers or wheel guards at door jambs are desirable, but not essential. Guards at free standing interior columns are essential.

** l. Fire Extinguishers shall be provided, - a minimum of one for each repair stall and one for each four storage stalls, all suitable for Class B and C fires.

1. Extinguishers shall be located remote from each other and in proximity to service area exits and adjacent to high hazard areas.

** m. Spray Painting facilities in a bus garage should generally be restricted to infrequent "touch up" work, in which not wore than an aggregate of one quart of spray coating material in used in any one day. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerous air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. This dictates that ONLY those districts whose bus operation is large enough to warrant the additional costs should consider complete spray painting facilities. Specific requirements for complete spray painting facilities may be obtained from 12 NYCRR 12 and 18. Such facilities must also be U.L. listed.

** 1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2.E.

** 2. Fire extinguishers shall be provided at exits of rooms used for storage of, and for application of flammable liquids.

n. Engine Heaters: Enclosed bus storage stalls generally prevent vandalism and theft, eliminate cold motors with associated hard starting and excessive wear. However, engine heaters have been satisfactorily used by some districts in lieu of enclosed bus storage facilities.

1. Engine heaters are generally of two types.

a. Electrically operated, thermostatically controlled external type heaters which when connected in series with the engine cooling system, circulate the coolant by gravity through the engine block. Integral pumps are available for positive forced circulation.

b. Circulated anti-freeze. A remote reservoir of antifreeze is heated (by gas or oil) and pumped through a piped system. Branch lines couple to the individual vehicles.

H-3 MECHANICAL

a. Plumbing:

1. All plumbing work shall be in accord with The New York State Uniform Fire Prevention and Building Code applicable to Plumbing.

2. Toilet and wash facilities shall be provided for drivers and mechanics. See section 2.G.

3. A supply of drinking water shall be provided. Use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.

4. Water supply and sewage system shall be approved by the New York State Department of Health or Department of Environmental Conservation, as applicable.

5. Hot and cold water should be provided at wash stalls, preferably through mixing-type hose bibs.

a. Detergent dispensing systems are available for consideration of use.

6. A cold water hose bib should be provided for each two storage stalls.

7. Floor drains should be provided: 1 for each storage stall and each repair stall, 2 for each wash stall. A continuous gutter can be used in lieu of the above.

a. Grease traps should be installed in floor drain lines connecting to sanitary or municipal drainage systems.

b. Flammable liquids shall be prevented from entering the building drainage system.

** b. Heating:

In maintenance areas and toilet rooms the heating system shall be capable of maintaining 60 degrees, F., minimum. Bus storage areas need only to be maintained above freezing. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit. Installation shall be in accord with requirements of the

National Board of Fire Underwriters.

** 1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2.E. Enclosure of all heating units is recommended.

** 2. Direct fired unit heaters (space heaters) may be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.

** 3. Where the heating system includes a boiler, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of 12 NYCRR 4, to adequately protect the health and safety of persons frequenting the facility.

4. Areas for storage of flammable liquids and for application of same (see section 2-M) shall be heated only by wet system radiation, or indirect forced warm air.

** c. Ventilation

Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

** 1. Toilet rooms shall be ventilated. A window opening to the exterior is acceptable at a rate of one square foot of operable area for each water closet or urinal. Mechanical ventilation is acceptable at a rate of 35 cfm for each water closet or urinal with positive means of intake air.

** 2. Motor vehicle fumes shall be exhausted at each servicing location by a duct or 3" minimum diameter flexible pipe, fitting tightly over the tail pipe and/or deflector, which discharges outdoors at a minimum rate of 100 cfm when not connected to tail pipes. Total capacity for a system shall be based on the total number of branch ducts; except that, where there are over four branches, and each branch has automatic closing caps, additional capacity may be based on 50% of the number of branches over four.

** i. Where there are no more than two servicing locations, a gas tight duct or flexible pipe of a diameter at least equal to the tail pipe, fitting tightly over the tail pipe, may be used providing the duct length shall not exceed 20 feet to termination outside.

** 3. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.

i. Proper goggles or shields must be worn when performing the above operations.

4. See section H-2m for Spray Painting.

d. Electric:

** 1. All electric work shall be in accord with the National Electric Code.

2. Electric service should be 220 volt with a minimum 100 amp entrance switch. Three phase service should be considered if available.

3. Permanent electric installations four feet or less above the floor shall be explosion proof. Installations above 4 feet need not be explosion proof, except as below.

** i. Electric wiring and equipment in room used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.

** ii. Electric lighting in storage room and work areas an in 3.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.

** iii. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.

4. A duplex outlet should be provided for each repair stall; for each two bus storage stalls.

** 5. Flexible electric cords shall be three conductor, extra heavy service type, insulated and grounded.

** 6. Adequate lighting shall be provided to illuminate all areas during working hours.

i. Lighting in bus storage areas should be over the aisles between buses.

ii. Properly placed lighting in service areas, (such as industrial type fluorescent) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.

iii. Exterior flood lighting to discourage vandalism should be considered.

7. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit energized on the service side of the main distribution panel.

H-4 <u>OPERATIONS:</u>

The following items will be among those requirements of the Department of Labor that will be reviewed by their Inspectors.

a. All machinery, equipment and devices in bus maintenance and storage facilities shall be so placed, operated, guarded and lighted as to provide reasonable and adequate protection to all persons therein.

1. Flywheels, cranks, connecting rods, revolving governor balls, gears, friction drives, sprockets and chains, etc., except where guarded by their location, shall be enclosed in such a way as to prevent accidental contact with them.

2. On all machines where a moving part leaves less than 18 inches space between another machine or between a wall or any other stationary object when it reaches the limit of its travel, such part, if exposed to contact, must be guarded or the space shall be barred against passage.

3. Guards shall be constructed and installed in a substantial manner. Ordinary fragile glass shall not be used as a guard or in any part of a guard.

4. Substantial barriers or screens of suitable height and width shall be provided where necessary to protect persons from flying objects.

5. Grinding, polishing, buffing, scratch brushing, abrasive cutting-off wheel, grinding or polishing belt strap operations, woodworking operations, and vessels operated at or in excess of the temperature of volatilization of toxic metals, generating dangerous air contaminants shall be provided with local exhaust ventilation and air cleaning devices.

b. All waste material of a flammable nature shall be deposited in metal-lined boxes with covers either self-closing or automatically closed through the action of fusible links.

c. Suitable receptacles shall be provided, and used in each toilet room for the storage of waste and refuse and shall be maintained in a sanitary condition. Receptacles used for moist or liquid waste shall be made of metal or glazed earthenware, or be metal lined, and shall not leak. They shall be kept covered, and shall be washed out as often as necessary to keep them clean.

d. Floors shall be maintained, so far as possible, in a dry condition. When wet processes are used the floor shall be drained free of liquids, but whenever a floor cannot be thoroughly drained, platform mats or other dry standing space shall be provided wherever practicable.

e. Periodically review requirements of the National Electric Code as they apply to expendable items such as a rubber mat under a main power switch, grounded electrical cords to portable equipment, damaged drop cords, etc.

f. Periodically review for possible damage to required safety items such as removal of floor plates for hydraulic lift recesses, damage to protective goggles used at certain machinery, worn and damaged parts of portable equipment, etc.

APPENDIX I

MAINTENANCE AND STORAGE FACILITIES

I-1 SITE DEVELOPMENT

a. Construction of school district maintenance and/or storage facilities is recommended to be on a site separate from a school building site or, if on the same site, as remote from school building as possible.

1. If on the same site, in addition to the above:

i. Construction shall not be attached to a school building.
ii. Vehicular circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion.

I-2 DESIGN AND CONSTRUCTION

a. General: School district maintenance and/or storage facilities shall be designed and constructed to afford adequate safety to all occupants of the facility.

1. Design should consider office space, lavatory and toilet facilities as well as the possibility of women occupants.

b. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.

2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.

3. Door width at required exits shall be a minimum of 36 inches. A pass (wicket) door in an overhead door may be approved as one of the required exits.

4. Exitways shall be unobstructed, with a 36 inch minimum clear width passageway.

c. Walls, Partitions and Roof Construction are recommended to be if fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance depreciation, insurance, etc. should indicate a suitable type of construction.

d. Storage Rooms for flammable liquids and heater rooms shall have walls and floors (and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

1. Doors of heater rooms should open directly to the exterior.

2. Combined storage and heater rooms are not recommended; however, in no case should storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

e. Floor Surface should be hard, dry, non-slippery, non-dusting,

low in maintenance and properly pitched to drain.

1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

f. Open-sided Floor Areas more than four feet above the main floor shall have the open sides guarded by 42 inch (minimum) high railings with intermediate rail and 4 inch high toeboard. An intermediate rail and toeboard is not required on platforms used for storing of materials which are regularly passed over the edge. At least two remotely located permanent stairs or ladders shall be provided to reach the upper level.

1. Exterior wall door openings four feet or more above grade shall be protected by railings.

2. Stairs shall be guarded on open sides by 36 inch high railings with intermediate rail.

3. Stairs shall have non-slip treads.

g. Fire Extinguishers shall be provided, all suitable for Class B and C fires.

1. Extinguishers shall be located remote from each other and in proximity to exits and adjacent to high hazard areas.

h. Spray Painting facilities should generally be restricted to infrequent "touch up" work in which not more than an aggregate of one quart of spray coating material is used in any one day. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerous air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. Specific requirements for complete spray painting facilities may be obtained from 12 NYCRR 12 and 18. Such facilities shall be U. L. listed.

1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2 D.

2. Fire extinguishers shall be provided at exits of rooms used for storage, and for application of flammable liquids.

I-3 MECHANICAL

a. Plumbing:

1. All plumbing work shall be in accord with the New York State Uniform Fire Prevention and Building Code applicable to Plumbing.

2. When a supply of drinking water is provided, use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.

3. Water supply and sewage system shall be approved by the New York State Department of Health or Environmental Conservation, as applicable.

b. Heating: A heating system shall maintain 60 degrees, F., minimum, in maintenance and toilet areas. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit.

1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2 D. Enclosure of all heating units is recommended.

2. Direct fired unit heaters (space heaters) any be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.

3. Where the heating system includes a boiler, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of 12 NYCRR 4.

4. Areas for storage of flammable liquids and for application of same (see section 2-H) shall be heated only by wet system radiation, or indirect forced warm air.

c. Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

1. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.

a. Proper goggles or shields must be worn when performing the above operations.

d. Electric:

1. All electric work shall be in accord with the National Electric Code.

2. Where gas powered equipment and/or volatile fumes will occur in a facility, permanent electric installations four feet or less above the floor shall be explosion proof. Installations above four feet need not be explosion proof, except as below.

i. Electric wiring and equipment in rooms used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.

ii. Electric lighting in storage rooms and work areas as in 2.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.

iii. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.

3. Flexible electric cords shall be three conductor, extra heavy service type, insulated and

grounded.

4. Adequate lighting shall be provided to illuminate all areas.

   i. Properly placed lighting in service areas, (such as industrial type fluorescent) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.

5. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit.

APPENDIX J

ACCESSIBILITY

J-1 GENERAL

a. Provisions must be make for the education of persons with handicapping conditions. All new construction must meet Code requirements and the referenced Council of American Building Officials (CABO) / American National Standards Institute (ANSI) - Standard CABO/ANSI A117.1 - 1992 relating to access and the Standard ANSI A17.1 1987 relating to vertical access.

b. In addition to the above requirements for approval by the Commissioner for new construction, all school districts and Boards of Cooperative Educational Services (BOCES) must comply with Federal Law in existing buildings.

1. Architectural Barriers Act of 1968

2. Section 504 of the Rehabilitation Act of 1974

3. Americans with Disabilities Act of 1990 (ADA), Public Law 101-336,42 U.S.C.§§12101 ET SEQ. The ADA addresses "schools", "public entities" and "places of employment".

J-2 PROCEDURE

a. State Law must be met by reference and detail on plans and in specifications approved by the Commissioner. The design professional must certify to this. Generally new construction will meet the requirements of Federal Law.

1. Additions and alteration work must meet standards for new construction.

b. Federal Law is administered in the field by periodic inspection and/or investigation of existing buildings. School districts and BOCES must meet the requirements for program access and building access as required at the time of inspection.

1. Existing buildings must meet Federal Law and these standards should be satisfied during such work. Minimum requirements to satisfy Federal Law can not be established at this time and for guidance contact Vocational and Educational Services for Individuals with Disabilities (VESID) at (518) 474-2714 or by fax at (518) 473-6073.

APPENDIX K

Record of Revisons

K-1 RESERVED

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